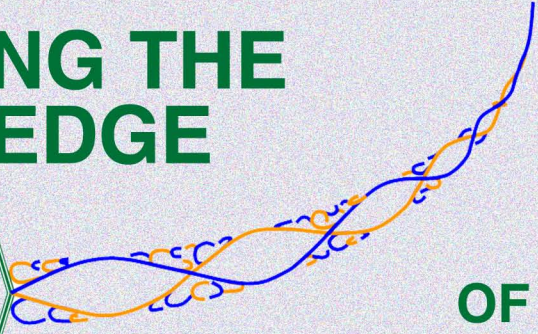
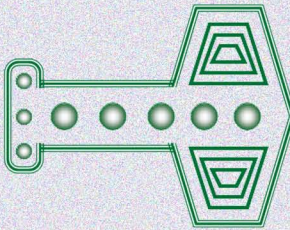


ON WALKING THE KNIFE EDGE



OF
SCIENCE AND
RELIGION

S T LAKSHMIKUMAR

On Walking The Knife Edge
Of Science and Religion

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S T Lakshmikumar



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नमो गुरुभ्यः

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**I am deeply indebted to
everyone who helped me learn
through
teaching, discussion and argument.**

This book is an attempt at organized expression of my subjective views regarding the roles of science and religion in my own life. As a scientist, I have made my humble efforts to understand the world as revealed by the great scientific exploration. As an individual, I have been influenced by the religious practices of my family, the society I live in and the knowledge of religion gleaned through my reading and contemplation. I have tried to find my own answer to the problem explicitly described in the Bhagavad Gita (Chapter 4, verse 16). “Even those with great knowledge are confused as to what action has to be performed and what action is ill-advised” (My translation). The present description of how science and religion could help guide our actions is an attempt by an individual with no demonstrated accomplishments either in scientific knowledge or religious practice. I do not know if these views would be useful or palatable to anyone else. I do not claim that ideas expressed here are original. I can only offer my humble apologies if these views are held to be unacknowledged paraphrasing of earlier scholars or if the views hurt anyone.

I am not sure how far my immediate family influenced this work through their ritual practice, non-scholastic theological arguments and emotional bonds. S Sankaranarayan, S Mahadevan, A V Subbarao, P N Vijay Kumar, R S Arora, S Mohan, S Dwivedi, T D Senguttuvan and other friends helped me refine my views through conversations, made suggestions and corrected mistakes. Hopefully the final product is coherent and presentable. Acknowledging all help and guidance, I also offer apologies for any perceived slight, fault or failure. I have cited some books by title and author but did not provide a bibliography since it is irrelevant in the “Google Era”.

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On Walking The Knife Edge

This is a personal attempt at analyzing a problem that can be stated quite simply. Can all human actions be guided purely by rational knowledge? The simplicity of the question masks the profound nature of the subject of enquiry. The problem has probably existed ever since man capable of thought had emerged on this earth. Certainly, many great minds, not all of them religious had pondered over the problem. And then again many and (including some great minds), impressed by the great progress of science in the last four centuries, would answer with a loud and unequivocal “yes”. Some of these may qualify this assertion with “in the near future” but join the rest in dismissing the necessity or utility of an enquiry. Consequently an audacious attempt at a self contained analysis, particularly by an individual with no halo of greatness in any sense is certainly foolhardy. But then, fools venture where angels fear to tread.

In the present context “rational knowledge” is knowledge that is usable, verifiable and communicable. It is knowledge that provides objective solutions to solve specific human problems. It is knowledge

that can be communicated to another human being by oral or written communication. It is knowledge whose claims of usefulness can be verified objectively.

Every man is a storehouse of such rational knowledge. At the simplest, information about which fruits are edible and which leaves are poisonous is rational knowledge available with a member of a nomadic tribe. The knowledge that enabled ancient civilizations to build palaces and temples is rational knowledge. Knowledge of how to prove a theorem in geometry is similar in nature. All modern technology is also rational knowledge.

This knowledge has two other important attributes which help one to distinguish it from other forms of “human knowledge”. Firstly, the knowledge can be organized as a recipe, subdivided into few or many small individual steps and communicated to fellow human beings. A number of characteristics of the plant, the shape of the leaf, the color of the flower etc., help the tribal in identifying a poisonous herb. A number of practical directions on selection of the raw materials, the required sizes and shapes etc., help a society construct a temple. The theorem in geometry is divided into a series of small steps.

A consensus or near consensus can emerge about the utility of such knowledge since usefulness can be assessed by everyone. Whosoever tries the recipe can record if it has delivered the result. Thus, the usefulness need not be accepted because of the fear or respect of the authority. To be sure, in many cases, there may not be freedom to question the authority or even the inclination to do so.

But the nature of knowledge is itself independent of this practical limitation. Secondly, the logic of the individual steps would be simple enough to be convincing to every individual. Thus, individual steps leading to the Pythagoras theorem would be intelligible to everyone and once again consensus of their validity would be possible.

This “rational knowledge” with a possibility of consensus on the validity of the individual steps and the utility of the recipe can be loosely called “scientific knowledge or expertise”. The problem is to know if this expertise is necessary and more importantly sufficient for guiding human actions. As mentioned above, most societies, have asked the question in one form or another. Is human knowledge sufficient as a guide for human action?

Everyone has some “scientific expertise” and uses it. This is equally true of the member of a nomadic tribe living by hunting and gathering and a citizen of the modern industrial society. For that matter even animals use such knowledge. Some animals use tools. Chimpanzees use a twig to fish termites. They must know a few things about how to select the twig. They select a twig of the correct size that has no thorns and does not ooze sticky liquids. Some animals learn new capabilities. A few Japanese monkeys learnt by themselves to wash tubers and to throw wheat mixed with sand into water to eat the floating grains. However, as far as anyone knows they do not ask themselves if such knowledge is sufficient for guiding all their actions.

Even though the domain of human knowledge has been restricted with the label “rational”, we are ignoring several complications. Not all things that can be described as rational knowledge are equally accessible or equally convincing to everyone. Individual steps in the recipe for proving a theorem in geometry may elicit an unequivocal “yes” from everyone. However, except in the simplest cases, reducing the recipe to such simplest steps would make it too large and cumbersome. Thus, understanding a recipe in practice presumes some training and knowledge. Not everyone may have the capability to understand the knowledge. They may not be inclined to put in the effort to evaluate the utility or the logic. In any case, it would be impossible for everyone to investigate and evaluate everything that is told to them. Thus, for many people, the acceptance of the utility or correctness of rational knowledge may be simply acceptance of

authority. In most cases of knowledge we defined a “rational”, we know from our day to day experience that the acceptance is actually not a binary “yes” or “no” but a graded response from very strong acceptance to strong refusal.

Then again many may refuse to accept the totality of the recipe for emotional or sentimental reasons, even when they are unable to find a flaw in the individual steps of the argument. While it will be rare, there is every likelihood of finding someone questioning even the simplest logical statement like two and two make four. So the consensus is unlikely to be universal. In the current era of easy large scale communication, strong support for any position and its exact opposite is very common. Thus, while the scientists and engineers continue their work on space exploration, treating the Apollo Moon landings as established milestones in their progress, there are groups convinced that the landings were a hoax. Technology has helped these heterodox and factually incorrect opinions to survive and thus prevent a consensus.

But the biggest objection to this restricted definition is the exclusion of other human knowledge which obviously influences and guides human action. Many a historian credits the description of the horrors of slavery in Harriet Beecher Stowe’s “Uncle Tom’s Cabin” for changing the perception of slavery in the northern states of USA in the period before the civil war. However, the influence was not enough to ensure civil rights to the blacks for another century.

There was possibly an influence of philosophers like Friedrich Nietzsche on the Nazi party of Germany. Both the Nazi’s and the soviet era communists declared some art as decadent admitting its role in influencing the actions of the individuals and the society. For the same reason, throughout history, books were prohibited by the various religious groups. The controversy about Salman Rushdie’s Satanic Verses is well known.

Thus most people admit readily that fiction, philosophy, art and music influence the personalities and are therefore guides to human action. However, as defined above, such intellectual and philosophical arguments, appeals to emotions and literature are not part of rational knowledge. In most of these, called “humanities” in contrast to science, there is no recipe, no decomposition into smaller steps and no objective criteria for deciding success. But there are strong claims of utility and support. We will consider these aspects of human knowledge later.

It is quite obviously silly to think that every action by any human being is best guided by rationality. Budian’s ass is an image of the possible consequences of extreme rationality. Budian’s ass is supposed to be extremely rational. It will not take any action without a rational justification. It is placed equidistant to two equal stacks of hay. Being rational it starves to death since it sees no rational reason to move towards either of the stacks, after all they are both equal in quantity and distance. No real donkey is as foolish as this. So Budian’s ass is merely an exercise in imagination.

Similarly no one seriously thinks that the restricted domain of “rational knowledge” is exclusively sufficient. Everyone includes the “humanities” mentioned above. The question is how close such knowledge is to science and how useful such knowledge and advice is. A very restricted definition of “rational knowledge” has been deliberately employed. It enables a clear elucidation of the relationship between sciences and humanities and more importantly religion in subsequent chapters.

Many people would claim that science or rational argument and even humanities are not sufficient as a guide for their action. They invoke religion as an additional guide. This is a group I loosely call the devout or religious. But even the most devout persons employ science as a guide for many of their actions. You do not see the devout lighting a candle in a gale. In this very act they recognize a role for rational

scientific logic in their lives. It follows that there has to be a boundary between their actions guided by science and by religion. The devout would, at least in practice admit the need for guidance by science rather than religion in some situations. Loosely speaking, they differentiate between the need for rationality and science in the realm of objective knowledge and of religion in the realm of “values” and subjective experiences.

A small fraction try to make this distinction into a well defined barrier creating what are called non-overlapping magisteria. For someone committed to this view, the boundary between objective consensual knowledge or science and religion is fixed. On one side are practical issues of science and technology where religion has no role to play and on the other side are values which are not defined by science. A third group labeled here as the atheists, deny any boundary to rational scientific enquiry. For them, current lack of rational guide to values is only a limitation of current scientific knowledge that can and will be resolved in future by scientific method. They attribute changes in societal norms and values with time to rational thought and scientific knowledge.

As if to compensate for this cavalier rejection of any necessity for religion in the modern world on the part of the atheists, a section of the devout firmly believe not only in the necessity for a religion as a basis for values but attribute a mystic and superior “truth value” to various aspects of religious thought. This includes many apparently different view points. For the present discussion, reservations about Darwinian Evolution, expressed by many fundamentalist Christians, is an example. There are efforts to create a “Creationist Science” but this is merely wishful thinking. Belief in miracles caused by divine intervention is another. The miracle is seen as a suspension of the normally expected (scientific) consequence prompted by prayer or observation of rituals prescribed by religion. The willingness to accept mythological descriptions that contradict science is another example.

There are a few more recent viewpoints that have been propounded by new age “gurus” and have become quite popular. These offer great many visions of modern science being limited, incomplete or unable to appreciate the “ancient” greater knowledge. Perusing the writings and sayings of these new age messiahs one realizes that that coherence in thought and expression is not even necessary for popularity and acceptance among the general public. It is very easy to analyze any representative sample using simple common sense. The sample will invariably consist of perfectly acceptable scientific statements which have no relevance to other statements interspaced in them which are vague, ambiguous and sometime incorrect.

These views often hang onto one much touted attribute of science namely that it is always changing. Current scientific orthodoxy is merely provisional. Thus just as Einstein proved Newton wrong, “future” would validate the truth of the claims of the ancient wisdom as expressed by these great expounders. In this view science cannot rule out anything as impossible. The absurdity of these views will be obvious when the issues of science are discussed in the next chapter.

In contrast to belief in things explicitly contradicted by science such as miracles or levitation of the body by transcendental meditation, a section of the devout actively seek the support of science for their scholarly explorations of religion. The use of quantum descriptions in support of Buddhist doctrine is one example. Drawing analogies between descriptions in quantum mechanics and in ancient Buddhist or Hindu scriptures took off in a big way with the popularity of books such as “The Tao of Physics” and “Dancing Wu Li Masters”. The limited utility of analogies will be a recurring theme in this analysis.

These are complemented by more main stream scientific investigations. Recent attempt at using Functional NMR Imaging for neurological examination of the various mental states associated with practices advocated by Buddhism is one example. The study of religious

instinct as a Darwinian adaptation is also popular among some religious people. Most of these scientific efforts attempt to identify if a physiological basis exists for the claims of religious practitioners. However, these are often viewed as the precursors to the much anticipated scientific validation of “religious truths”.

In reality, even a devout person, justly respected for exemplary personal life and positive contribution to society fails to convince when religion and science are mixed. Consider, Swami Vivekananda, who was a key contributor to Hindu renaissance at end of the nineteenth century. He was an exemplary human being and the organization he founded, “The Ramakrishna Math” continues to provide medical and educational services to the needy.

Consider a few of his sayings. “If it be true that the whole of this universe is built on exactly the same plan as the atom...”. “Everything in this universe must return to their finer causes, disappear, be destroyed as it were. But they will live in the causes as fine forms”. “The little cell, which becomes afterwards the man, was simply the involved man and becomes evolved as a man”.

He is obviously understanding science as a series of descriptive statements about nature. He is drawing analogies between such statements and ancient religious views. He was not treating science as a quantifiable and mathematical tool to understand nature.

His devotees make vigorous efforts to attribute to him a deep understanding of everything from quantum physics to evolutionary science and Marxism. He had a better understanding of the distinction between science and religion. He said “In every exact science there is a basis which is common to all humanity, so that we can at once see the truth or the fallacy of the conclusions drawn therefrom. Now the question is: Has religion any such basis or not. I shall have to answer the question both in the affirmative and in the negative.”

In all efforts to link religion and science, the essential difference between the strength of various parts of science is not really appreciated. The distinction between improbable and impossible depends on the quantification of the probability but this is simply bypassed. Once again the limited strength of analogies is difficult to grasp for many. It is not easily realized how flexible human language is, how easily analogies can be constructed and how little they contribute to any meaningful understanding of either subject.

The above describes how the religious or devout people react to aspects of science they do not like. They try to use the flexibility of language to mask the conflict between science and religious views. Alternately, they ignore the conflict and hope for a future resolution in their favor. However, the devout do not have a monopoly on such *ad hoc* rejection of small domains in science. Atheists sometimes exhibit the same lack of appreciation of the strengths and weaknesses of science.

Consider George Bernard Shaw, an atheist, humanist and committed socialist. Shaw could never accept the randomness implied by the Darwinian evolution. In Darwinian evolution random changes in the organism are preserved if the changes help the organism in having more descendents. The key point is that the changes have not been caused intentionally. Shaw had an ideology that he expressed explicitly. "I would think more; therefore I must be more". "If my finger is the organ by which I grasp the sword and the mandolin, my brain is the organ by which Nature strives to understand itself". He could not accept that the changes in the individual were merely random and not directed by the individual, that evolution had no purpose and implied no progress. He bitterly complained against Darwinian Evolution as extrapolation of what every plant and animal breeder knew and employed. Since Shaw was merely an individual without any power, he could only express his resentment against science in his writings and fiction.

Trofim Lysenko was another individual who was committed to his Marxist ideology, which he felt was being challenged by Darwinism. Being the minister in charge of agriculture in USSR, his ideological measures to make scientists realize their mistakes severely damaged both genetic science and agriculture in the Soviet Union. Many Marxists do not have such issues with Darwinian science. But this is not relevant for the present discussion.

The examples only caution that atheism cannot be some kind of a golden standard which will ensure that individuals following it will always accept science. Sometimes ideology limits acceptance of science despite atheism or self proclaimed rationality. However, this practical limitation of atheism is not the justification of the present exploration of the boundary between science and religion as guides for human action.

The devout fail to understand the mathematical foundations and links between various aspects of science. Consequently, they underestimate the strength of the discipline in its totality. Those of the secularist, humanist, atheist persuasion often tend to be blind to the weakness of the scientific evidence. They fail to distinguish between the strength of a mathematical theory of physics and the limitations in extrapolating the theoretical foundations. They ignore the weakness of the statistical evidence backing many other disciplines. Consequently the intellectual arguments with which they try to back their own version of values are not as strong as they would claim.

Most atheists while expressing a hope for scientific or rational basis for values criticize scientists who admit to have religious beliefs as the basis for their values or who support religious persons. But, the great physicist Richard Feynman in his trademark casual statement dismissed the possibility of getting human values from a scientific investigation. “The problem of moral values and ethical judgments is one into which science cannot enter”. What is one to make of this? It

beggars belief that a person committed to understanding the world to the extent of talking to prostitutes and gamblers and never respecting authority was being silly.

Let us consider as another example, the analysis of Mahatma Gandhi by two scientists. The review of Joseph Lelyveld's book "Great Soul: Mahatma Gandhi and His Struggle With India" by Christopher Hitchens is a sample of the standard atheist intellectual approach. It questions the values, particularly the religious values of Gandhi. It ridicules the near universal title of Mahatma or great soul bestowed on him. Now contrast this with the statement of Albert Einstein "Generations to come will scarce believe that such a one as this walked the earth in flesh and blood". I am sure even Hitchens would not have questioned Einstein's status as a scientist or his commitment to science. It would be a travesty to think that Einstein had become a doddering old fool when he made that statement or to think that he was being politically correct. This does not mesh with his role as a philosopher scientist. These are some reasons that encourage one to explore very carefully and independently not merely science but religious views and experiences.

The above statements, explain the desire to examine the boundary of science and religion in a general way and in particular the roles each have in guiding human actions. But this does not constitute the acceptance of a well defined boundary between the two magisteria of scientific facts and religious values. In science one counter example has to be accepted as the proof of failure of any hypothesis. The hypothesis that religion is an independent authority on human values, can be countered by countless examples of repugnant values advocated by the religious.

My own favorite example which challenges the ability of religion to independently define human values is from the American Civil War. The two combatants in the American Civil War swore on

the same Bible. One side insisted on a right to treat some human beings as slaves. The other arguably fought to maintain the union of states and not because they wanted to free the slaves. But they did ultimately abolish slavery.

Similarly, the supporters of the apartheid regime in South Africa were largely Christian. Avowedly the African National Congress was Marxist and thus by implication atheist. However, there were many other opponents of apartheid like Desmond Tutu who were committed Christians.

Thus far, we recognize that in human history, religion and science have both been used as guides for human action. Hopes of an eventual elimination of religion as a guide appear naïve. The attempt through a forced program in the erstwhile communist states in Eastern Europe and Russia failed.

Peaceful elimination of the role of religion is hoped for through the implementation of extensive social support in the democracies of Western Europe. Complete success has not been attained in a hundred years. The formation of non overlapping magisteria of objective truths and subjective values appears to be equally naïve. The same is true of the hopes of a return to an earlier era of dominance by religion.

I have said that the present analysis is scientific in spirit. So, scientific findings will always be accepted. Neither miracles nor levitation will receive any serious respect or discussion. Science is not expected to contribute towards understanding or appreciating religion. In some sense the description here is a science of living. “Man is not made to understand life, but to live it” said the philosopher George Santayana. The present description does consider the necessity of religion alongside science as a guide for human action. However, as we delineate the boundary between science and religion we will come up with a somewhat novel view of both.

This discussion proposes a new paradigm for the boundary between science and religion. This draws on the description of fractals and self similarity. Such word associations are never to be taken seriously or exactly. Fractals and self similarity are precise mathematical ideas that have enriched science. These are best appreciated by the layman visually, by viewing pictures of fractals. They all consist of larger and larger structures which look eerily similar to the smaller pieces of which they are composed. Certainly the boundary between science and religion is not being defined mathematically and the existence of a fractal boundary proved logically.

However, the basic idea is that as a more and more precise examination of any issue requiring human decision is attempted one comes across a certain close intermingling of science and religion as the possible guides. Thus when a scientific problem is analyzed, at the gross level it all appears to be logical, communicable and potentially a consensus of its utility can be envisaged. As the same problem is examined more and more minutely one sees large areas of randomness and uncertainty. This leads to acceptance of issues at face value and on value of authority, traits that are normally associated with religion. The reverse is also true. In many areas where religion seems to be the basis for action by an individual, closer examination reveals smaller domains constrained by rationality.

It is said that a picture is worth a thousand words. So the cover art is an attempt at depicting the edge of a knife as the boundary between science and religion. Choosing two colors to represent the two, a complex fractal boundary has been depicted along the knife edge. Einstein famously said “Science without religion is lame, religion without science is blind”. This quotation has been most difficult to swallow not only for atheists but for many other scientists. Other statements of Einstein have been often employed to clarify that Einstein did not mean what almost every other human being refers to as religion. The discussion here assumes that the quotation is more perceptive than

what Einstein was consciously aware of. The statement is true in a sense in which he probably did not anticipate and most certainly did not explicitly describe.

In as much as the present discussion challenges explicitly the atheist position, it was sore temptation to call this monograph “Laughing At Atheists”. To laugh does not necessarily mean being derisive about. Nor does the present analyses challenge every aspects of atheistic criticism of religious attitudes. Nonetheless, we conclude that the atheist approach is certainly incomplete and therein lies the amusing thought. That despite all the emphasis on logic, it leads you to a paradox very much in the spirit of Godel’s theorem. This theorem was a shock to an earlier generation of mathematicians. Speaking loosely, it proved that there will always exist mathematical conjectures which appear to be true, but which cannot be proved or disproved. They may be supported by many examples but the mathematicians cannot convert them into theorems. They cannot rigorously prove the truth or otherwise of these conjectures.

The present discussion will utilize some of the knowledge acquired personally over the years. However there will be no reliance on either original texts or on the extraordinary amount of scholastic knowledge available on the topics under consideration. This is partly inevitable. It is impossible for any individual to condense in any logical, justifiable method the entirety of accumulated human wisdom. Secondly I personally hold that there is no real sense in discussing the original texts. What the author meant when he used a particular word or phrase can never be satisfactorily proved. For an example we can look at the confusion created by Einstein’s famous quote referred to above.

I personally appreciate this problem of understanding the true intent of the author in the circularity of language definitions. We can search for the meaning of a word in the dictionary but the answers we

get are other words. These are in turn defined in the same dictionary often using the original word. The word and its meaning are actually inseparable. We can only guess the meaning. So a scholastic analysis is not to my taste. I prefer the poetic language of the ancient Indian poet Kalidasa who compared Lord Shiva and his consort Goddess Parvati to the word and its meaning. Apparently they are separate but in reality they are not.

In science the non reliance on the original texts is quite common. No student of physics ever bothers to read either Newton's principia or even the great 1905 publications of Einstein. The reason is simple. Since the great intellectual efforts of these giants, simpler and more coherent ways of understanding the ideas have been developed. Many of the issues which were relevant at the time of the original research have ceased to be of interest. Newton used geometrical proofs for many of his hypotheses. This is almost universally ignored today.

For science, logic of the arguments and verification by experiments are essentially independent of the path along which the discovery was originally made. However in areas such as philosophy and religion, to discuss without reliance on earlier discussions and original text may appear foolhardy. While I will continue to use examples and quotations they will be nothing more than ornamental. The essence of what is proposed to be said has to emerge and be accepted in itself.

Thus I am expecting a near universal acceptance of the present analysis in the spirit in which a new approach to teaching established science is accepted without reference to earlier and original texts. Hence my earlier statement that this is a bit like science of living. I am trying to flesh out my own personal answer to the question of Swami Vivekananda. "Has religion any basis common to all humanity?" In religion this near universal consensual acceptance has to be of subjective

experience. Just as a few individuals may be found to question the most rational of arguments about two and two making four, there can be simple unwillingness to accept the present discourse.

However, I am still hopeful of the acceptance of those who take the trouble to actually read this. The resistance to the present analysis may be reinforced by the rather novel personal description of religion. The atheists and the devout may both disagree with it. Possibly both disagree with it so much that they will reject the analysis in its totality. Perhaps somewhat arrogantly, I think of myself as being like the little child in Hans Christian Anderson's fairy tale "The Emperor's New Clothes" The child said " but the king is naked" notwithstanding the opinions of those superior to him and around him who were singing the praises of the non existing clothes of the king.

For the present, with the above limitations in mind, let us proceed by provisionally accepting the idea that there is a real boundary between science and religion. That humans walk along this boundary in the sense that they are best served when guided by a complex intermingling of science and religion. The first assumption for this provisional view is that science in itself is not a sufficient guide as hoped for or claimed by the atheists. Why this is so is examined in the next chapter. This description is actually an examination of science in its totality, not a scientific examination of religion in sociology, evolutionary science or psychology though these will be touched upon. The logic of this chapter will form the foundation for the rest of the description.

II

Bounds Of Objective Exploration

Objective exploration is an appropriate description of the rational knowledge or science described in the last chapter. We will try to understand its limitations as a guide for human action. We used a very restricted definition of “rational knowledge”. It must be objectively verified by experience. It must in principle be broken into small individual steps each of which are easily confirmed to be logically correct. Finally it can be communicated to other individuals. Thus, a near consensus on its utility may emerge.

The conjecture that such knowledge is of limited use as a guide to human action, leading to the necessity for other options will be substantiated in the rest of the chapter. Briefly stated, we expect to see limitation of the guidance offered by such knowledge since in every case this involves extrapolating from knowledge acquired in one situation to another which appears similar. In the simplest example cited in the earlier chapter, we describe the characteristics of edible or poisonous plants. We expect to use this knowledge to decide if the plant under observation is edible or poisonous. We are trying to assess

the strength of knowledge. How correct and useful are the characteristics we selected?

However, this concern about extrapolation is not related to the philosophical issue of induction. Induction for a philosopher is a question of how any objective knowledge, such as the fact that the sun has risen for so many years can logically be used to support the expectation that the sun will rise tomorrow. Irrespective of whether a philosopher approves or not, in practice, it is sensible to consider that the sun will rise tomorrow.

We are also not going to unduly worry about how far the average individual can evaluate the utility of something claimed to be objective knowledge. Unlike the simple example of the sun rising or not, most modern scientific theories and mathematical proofs are very complex. They may be in principle amenable to reduction to individual logical steps. But to understand and confirm the logical nature is beyond the ability of most humans. No one who has not been extensively trained in modern mathematics can make sense of the recently unveiled proof of Fermat's last theorem. This conjecture of Fermat regarding numbers was finally proved by mathematicians after 350 years. There can also be a philosophical disagreement if rational knowledge and science are the same. There will be no difficulty in accepting that science and technology have the characteristics attributed to rational knowledge. I will ignore this philosophical concern too.

Complexity is an attribute of highly technical science and mathematics. So is astrology. So should one defer to an astrologer's superior knowledge of a complex field as well? Would this lead to possibility of a conspiracy by the learned? In what way is this different from the hold witch doctor's had over tribal societies? This issue is once again not very relevant for the present. We hope to be able to understand the limitations and strengths of science as well as nonsense as we go along with this brief description.

What is the importance of the sophisticated theories of mathematical physics? Are they being accepted on faith since they are so complex that even most physicists and mathematicians cannot verify their validity personally? The answer is very simple. These theories have a breathtaking capability to predict consequences of experiments. When Newton proposed the theory of gravitation, he showed that the force acting on the moon in its orbit and on a cannon ball fired on the earth could be quantitatively related. When Einstein corrected this theory to account for small disturbance in the orbit of planet Mercury he was talking about an error of a few seconds arc per century. A second of arc is such a small angle that if the two pieces of wood, each 10 meters long are hinged at this angle, the gap at the other end is one twentieth of a millimeter.

Everything in the universe except for gravity, radioactivity and nuclear forces is understood using the modern theory of quantum electrodynamics. Quantities, theoretically calculated using it agree with experimentally determined values to an amazing accuracy. If one had an equally accurate theory for calculating the diameter of the earth, it would be accurate to the thickness of a human hair.

But the attraction of these theories goes beyond merely experimental verification to an amazing accuracy. The mathematics used in the best theories include what are technically called symmetries. These ensure that the experimental results do not depend on when an experiment is performed, at what place it is performed and so on. Obviously having these symmetries in the mathematics is fundamental for any objective description of reality. One cannot expect any theory that does not include these symmetries in the mathematics to be useful.

This inner strength of fundamental science is the reason many a crack pot science idea can be rejected very simply. The advocates get upset that the “scientists” are not paying them any attention and assume that there is a conspiracy.

An amusing anecdote illustrates how strongly a scientist believes these fundamental theories. Albert Einstein developed the general theory of relativity in 1916 and it was spectacularly confirmed by experiments in 1919. This being a modification of Newton's ideas after 300 years, there was a lot of press coverage. Einstein was asked, what he would have thought if the experiments did not agree with the theory. Einstein commented "I would have been sorry for the dear Lord the theory is correct". So a physicist is not easily swayed by individual observations that would not fit into the theory.

Another famous scientist, Richard Feynman proved this indirectly with two post scripts at the end of his popular book on quantum electrodynamics (QED : The Strange Theory Of Light And Matter). In the first he announced one (then recent) observation which questioned the basics of the theory. In the next post script, introduced a few months later, he pointed out that this observation and consequent claim failed. Unfortunately in such situations, the news services pay much more attention to the first. As this is being written there was a flurry of announcements that particles faster than light were being seen questioning Einstein's theory. It all fizzled out, just as those with a firmer belief in the fundamental theories expected all along. As we can see, our earlier claim of objective verification of conclusions is neither straightforward nor easy.

In view of the incredible accuracy of some of the predictions of these fundamental theories, there could be a resigned acceptance of the science. Unfortunately, this halo of greatness of science is appropriated by each and every scientific investigation. This is more problematic than the resigned acceptance of fundamental theories. Actually the relationship between these fundamental theories and issues of direct relevance to human decision making are rather tenuous. For that matter, as described below, the relation between these fundamentals theories and most of the research conducted in physics is itself quite tenuous.

Most research in physics is based on phenomenological and empirical relationships. These terms need some explanation. This is best accomplished by considering one example, that of a MOSFET. This is simply an electrically operated switch. Every computer has millions of these switches mostly made of silicon. When a physicist visualizes such a device he needs to use the conclusions of fundamental theory. The quantum mechanical theory explains the properties of semiconductors like silicon. It thus shows how these can be used to create the concept of this switch. In current devices this switch is as small as a millionth of a centimeter and changes from on to off in a billionth of a second. When the engineer tries to decide on how a piece of silicon is to be converted into a working device he cannot use the theory. In every such device a thin layer of silicon oxide is needed. The temperature to which silicon is to be heated, the time for which it is heated, the chemical environment in which it is placed etc. are all determined practically, just like a potter deciding the recipe for firing his earthen pot. These are the empirical or phenomenological relations mentioned above. In this case there is a relationship between the temperature, time etc., and the thickness of the oxide formed. These parameters can be continuously changed in small steps leading to the identification of relationships. At a given temperature the thickness of the oxide increases linearly with time. When the time is doubled the thickness is also doubled. But when the fabricated MOSFET device is to be tested, the engineer uses a statistical evaluation. He subjects a large number of devices to high temperature, high electric voltage or humidity and classifies the devices as working or failed.

Thus even in this most advanced technology, one sees fundamental theory which provides the ideas, phenomenological or empirical methods and finally statistical analysis. Along the line, the confidence in the results keep decreasing. Fundamental theory offers guidelines to the engineer about the phenomenological and statistical analysis employed to design and make working MOSFETs. Thus the empirical relation used by the engineer to grow a desired thickness of

the oxide makes sense in the light of fundamental theory. However the parameters like temperature and time, employed in the fabrication cannot be calculated from the theory. The approach of the failure statistics, subjecting the device to harsher conditions appears “reasonable” in the light of the fundamental theory. But the statistics obtained for one device are unrelated to another.

Similarly, fundamental science can offer guidelines to problems of relevance for human decision making. Fundamental theory can offer guidance in evaluating astrology, homeopathy and the fear of radiation emitted by cellular mobile phones. In all cases fundamental theory points to a lack of mechanisms to back the claims. Contrary to astrological claims, the planets can only influence us through gravity and the force is smaller than the force between two humans sitting side by side since the distance is small in this case. The influence of a chemical on the biological processes in the body cannot increase with dilution as claimed by homeopathy. The energy in the photons from mobile phones are too small to effect the cellular activity since the body at normal temperature is continuously emitting and absorbing photons of much higher energies.

But in most cases of relevance to humans ranging from medicine to social sciences, the advice offered by the experts is actually based on the weakest science namely statistical analysis. It is most easy to appreciate the limitations of statistical analysis by considering the problems of medicine. Consider headache as the simplest example of a medical condition requiring medicine. Now the first problem is quantification of the pain. We have difficulty in comparing pain intensity in two instances of our own pain not to speak of comparison of two different individuals. Secondly, most headaches are self limiting. After sufficient time even without any medicine the problem subsides.

In advocating aspirin as a medicine for headache, the medical community of doctors and researchers select a large group of patients,

provide medicine to some of them and confirm that statistically more people are relieved of the pain faster. This does not ensure that every single person who has used aspirin will be better off in terms of the intensity and duration of suffering as compared to every individual in the group who has not used the medicine. Finally, as with most medicines, there will be unwanted side effects. In the case of aspirin it is nausea and vomiting. There are no rational ways of integrating all these features and deciding if I have to use medicine today for my current head ache or not. Thus medical information is needed and useful. It is useful to know about side effects, realistic estimate of benefits and so on. However the integration of all this knowledge is itself a non scientific exercise.

The example cited above was deliberately chosen to be simplistic. But one faces exactly similar problems in other cases. The doctor has to integrate the probable extension of the life of a cancer patient when he is given chemotherapy, the suffering that the patient will undergo in the remaining period of life, the side effects of the medicine etc. Each of these is individually studied by scientific procedures but there is no way you can scientifically investigate the totality.

Similarly, one can estimate the probability of a vaccine reducing the risk of a communicable disease. one can also estimate the probability of adverse reactions. But the benefit of my being vaccinated is shared by the rest of the society since the chance of my communicating the disease to others is reduced but the risk of the adverse reactions will be borne only by me. The society will somehow has to come to a final conclusion whether to enforce universal vaccination but this is once again not a problem to be solved by science.

When testing MOSFETS, it is possible to investigate extremely large number of devices to increase reliability of the estimated failure rate. Similarly, an airplane certified for carrying people has extremely

high reliability. Confidence in this high reliability figure is the consequence of an enormous number of tests that have been carried out on each of the subcomponents of the airplane. Obviously, such testing is limited by the resources available for testing and the social desirability of imposing such requirements.

In case of medicine, issues of ethics complicate the issue. During the time a potential medicine is being tested, it is not available for use. So individuals who would have potentially benefited continue to suffer. The standard practice in medical testing is to give a placebo for some of the participants of the test. The patients are under a false hope of being cured. Is this ethically justified? Similarly, a doctor may continue testing to confirm his diagnosis but has to balance the benefit of further testing against continued suffering and risk for the patient.

In some medical situations even determining low probabilities is impossible. The probability for an adverse reaction to a vaccine is most important for societal decision to emerge. It is simply scientific nonsense to claim that any vaccine is absolutely safe. Guaranteeing absolute safety is scientifically impossible. Similarly, it is impossible to confirm that microscopic quantities of pesticides or other poisons are not dangerous. Determining the dangerous dosage, at which there will be adverse effects of any poison is easy. But what would be the consequence of a thousandth part of such a dose cannot be determined. Despite concerns of environmentalists and the demand for mandating extremely stringent low levels of such “poisons”, one has to face the truth that this is not a conclusion based on science.

The reverse is equally true. No doctor can really confirm that a given case is terminal. Almost every doctor has faced spontaneous remissions where the dangerous cancer he diagnosed has miraculously disappeared. Then there are psychological effects. Positive attitude of the doctor and patient contributes to a better than statistically expected cure. In some cases, placebos, sugar pills given as medicine seem to

work. Incidentally all this is the state of the mainstream medicine. Unlike alternate medicine, mainstream medicine accepts the principles of physics and chemistry and is developed on the scientific methodology. Unlike physics, modern medicine has no independent fundamental theory. It accepts the limitations imposed by physics and chemistry on living organisms. In contrast, as mentioned above, astrology or homeopathy invoke principles that contradict fundamental physics.

The reason for highlighting these limitations of medicine is not to disclaim the incredible success of modern medicine in the fight against disease. Contrary to the passionate claims about the superiority of ancient civilizations and ancient life styles, every statistical measure, life expectancy, infant mortality, number of centenarians, deaths due diseases ranging from small pox to polio etc., loudly proclaims the success of modern medicine. The purpose of the above description is to point out the necessity for integrating various facts that cannot be mathematically related despite individually being the result of scientific investigations.

Newton had been an enormous influence outside physics. He inspired grand unified theoretical developments in many areas. The most prominent example is Darwin's theory of evolution. This is fundamental to biology and explains the emergence of all living organisms on earth. Random changes occur in the organism during reproduction. Some of the changes enable some members to have more surviving offspring. Members with these changes eventually become most common. Since food resources are finite, over a long time the small improvement in surviving offspring multiplies to the so called "survival of the fittest".

The theory is indirectly related to the fundamental processes of physics and chemistry. Thus any investigation of the bio-molecular processes in a living organism will always reveal the operation of the

theory of evolution at the microscopic level. That the implementation of these evolutionary steps is in accordance with principles of physics and chemistry will also be confirmed. Experimental verification of modern molecular bio-physics has been extremely successful. For many lay people, scientists have been too successful for the good of mankind.

However, as one investigates the operation of the theory of natural selection at the level of complex entities like the organism or a population, the links with physics and chemistry recede into the background. Also absolute confirmation becomes an issue. The analysis becomes more qualitative and statistical. It becomes difficult to rule out historical contingencies. A bird may be successful in an island and appear selected to fit the environment. But it may have come to that island by pure chance, “founder effect” as it is technically called. It becomes impossible to rule out such historical accidents. When the mechanism is invoked to explain psychological and behavioral aspects particularly of humans, the strength of the fundamental theory weakens substantially. The basic reason is the statistical nature of the evidence.

Fundamental theories in other areas of importance to human life have similar limitations. Nothing is as easy to appreciate as free market economic theory. While a grand edifice of extremely complex mathematics has been setup, the economists themselves are confused about the project. The contrast with the physicist is worth noting. The physicist wonders at how well the theory works and lyrically expresses the ecstasy and exclaims with wonder that “The miracle of the appropriateness of the language of mathematics for the formulation of the laws of physics is a wonderful gift which we neither understand nor deserve” as Eugene Wigner did. An economist is simply confused as to what his model means and one can easily find economists questioning the whole idea.

The problem is once again the refusal of economic variables to behave as well organized mathematical functions. Consider the basic

axiom of market economics, the free exchange of 3 apples for 4 four oranges. Does 4.005 oranges have any meaning to most people? But the economist insists on treating demand and supply as continuous variables and use advanced mathematics. While it is wonderful to think that eventually we are all better off if markets are left alone, historical accidents are as important in economic life as in evolution. I am interested in economics only as long as I live. The economic theory does not quantify time and that puts a spanner in the works. Marxist analysis fails to quantify time as well. No one knows how far away the Marxist revolution is anymore than a Christian knows how far the Judgment Day is. A recourse to empirical adjustment and statistical data makes the fundamental theory more an ideology than science.

Psychology is another example of an area that is given more weight than the fundamental theory deserves. While Freud does not have much respect in current psychological circles, the transition from Freudian to post Freudian theory does not resemble the transition from Newtonian to relativistic physics with well defined boundaries. There are no boundaries which define the boundaries of these psychological theories. One must and should respect the empirical basis of much of psychological research. At the same time one has to recognize the essential limitations of the statistical evidence. It may appear sensible to permit a psychologist to assess a patient to be legally insane and therefore deserving of sympathy rather than punishment. But in really deserving cases even a layman can diagnose the insanity. Permitting the psychologist to evaluate a perfectly normal human being who murdered a hundred people and recommend “sensible path of action” is actually insane.

It is useful to highlight some of the other limitations of statistical scientific knowledge. This reveals why use of such scientific knowledge to dictate societal action becomes problematic. In any statistical study the most important issue is the difficulty of identifying an identical group for comparison. The claim that a specific parameter is proved to

be statistically significant is obtained by comparing two groups which are claimed to be “identical” in all respects but for the specific parameter. This is common to both social sciences and medicine.

In modern medicine a range of investigations are available. These provide a reasonable if not absolutely reliable way of selecting a group where one can expect a similar outcome of the medical condition or disease. If we go back to our earlier example of headache, we select a group in all of whom the intensity and duration of pain without the medicine is reasonably same even when it can never be identical. Even here, there are many hidden variables that are revealed only subsequently. The most famous example is the ignorance about the medical consequences of smoking in an earlier era. Till the consequences were officially recognized a study would never have considered cigarette smoking as a parameter that has to be checked for all the members of the groups. Thus results of many earlier studies became questionable. There is no way to know if a current study has missed a hidden variable. That would only be known in future, limiting the confidence in such statistical conclusions.

When other societal issues rather than medical matters are studied, the issues of hidden variables are complimented by base line fallacy, change of attitudes and conscious decisions leading to changes in the base population. At some point in society use of politically incorrect language may indicate lack of sensitivity to minority and feminist issues. However, a conscious decision to use politically correct language complicates the utility of this test. People may still lack sensitivity or even sympathy to these issues but may use the “correct” language and escape detection.

In contemporary societies, youngsters and children take extreme steps including suicide in response to corporal punishment. Such evidence of the negative impact of such actions is used to demand societal norms and legal procedures for punishing transgressors.

However, it has to be faced that the issue is not really the punishment but the societal attitudes. When corporal punishment was the norm in societies as it was till recently, such extreme reactions were unknown. The issue is not whether corporal punishment is not to be banned. It is to intellectually understand the limitations of the science backing the societal decision.

Just as there is no effective medicine without some side effect, there is no conclusion of statistical social science without another antagonistic conclusion from other studies. Thus a study claiming psychosis due to parental interference is followed by one advocating “parental discipline”. Unlike physics, there is no fundamental mathematical theory. So mutually antagonistic conclusions are the norm in social sciences. These severely limit the utility of science as a guide in important societal and human issues.

Base line fallacy is another reason that limits the utility of statistical scientific evidence. This comes into play when the probability of occurrence of events is very low. Consider an experimental facility setup to test the possibility of an earthquake during the course of the next day. This is not possible with current scientific capabilities. This is only a thought experiment being used for illustration. Since the test is scientific it has a probability of error. Let us say the test is 99% accurate meaning in one out of hundred trials it will give a false positive and one false negative. But even in a highly risk prone areas an earthquake occurs less than once in a few years. Thus during this period the test will give far more false positives (one very hundred days) than real positives (one every few years) making the test useless.

Despite the desire, human science cannot provide a scientific action plan required to predict earthquakes. The case of the earthquakes is similar to the issue of pesticide residues cited above. Base line fallacy, an inherent statistical limitation kills our aspirations. Similar is the reason for the endless debates about global warming. A small increase

in the average temperature of the earth along with an increase in carbon dioxide content to values much higher than ever known on the planet earth has been experimentally established. It is simply beyond human capability to “scientifically prove” that this “will” result in specific climatic disasters. One can only construct models. The variations observed in the temperature and carbon dioxide concentrations over the past million years are certainly complex. Modeling them exactly and proving everything exactly is simply impossible. The problems include the relative rarity of severe weather phenomena leading to base line fallacies and use of averages that can be mathematically calculated but cannot be justified. The average rainfall on a given day is a meaningless number. You cannot justify averaging zero (no rainfall) and 10 cm (a downpour).

The necessity for reconciling mutually antagonistic advice or integrating mutually exclusive paths of action advocated by different scientific conclusions is thus quite apparent even in the cursory survey of science attempted here. It is amusing to note that a logical theorem proves the impossibility of forming a “rationally justified” conclusion from mutually exclusive choices. This is known as the Arrows theorem, but is often limited to discussions about democratic choices. When there are many independent choices, there is no rational common conclusion.

The requirement for integration is best illustrated by the Greek story of cutting the Gordian knot. As it is usually told, there was a prophesy that he who unraveled the Gordian knot would become the ruler of the world. Alexander the Great cut the Gordian knot. It probably is necessary in most real life situations to cut a Gordian knot since rationality is not sufficient to untangle the issues. Traditionally, literature, ethics philosophy have all been recognized as indirect help for an individual in making the decision simulating the decision to cut the Gordian knot. The similarity of this approach to certain aspects of practice of religion will become apparent in later chapters.

The simplistic idea that just because human technological abilities are continuously progressing, every problem conceivable by human mind can and must be solvable is quite mistaken. Even in logic, Godel's theorem proved that it is not possible to prove all theorems that are true. As mentioned above, certain technologies like a method for predicting earthquakes can be very attractive but will remain beyond human capabilities. Similarly, with the advancement of technology there are demands to prove that anything new is "absolutely" safe. Ever more stringent implementation of the precautionary principle, be it against nuclear power or a microscopic pesticide residue in food etc. will gather support from the society. But the utility of such efforts is scientifically questionable. Delivering such societal demands may be beyond human capabilities.

Conversely fundamental science may provide strong arguments against very popular non scientific approaches. The scientific argument against astrology has had only modest success. Homeopathy continues to garner support despite violating basic science. There are many others ranging from human levitation to free energy schemes that are similarly attractive to sections of humans society. Despite being clearly contrary to basic physics, the fear of "radiation" from mobile phones or power lines continues to be active even among doctors. Here, the statistics of rare events permits false positives and restricts the possibility of proving absolute safety.

The process by which various norms get approved in the society, how and why the members of the society are committed to their choices and the utility of many norms implemented in the past can be subject to scientific investigation. Such research once again shows the limitations outlined above. In general, investigation leads to more dilemmas and doubts. Once the health damage due to smoking has been established, the societal issues of how to discourage smoking have occupied center stage. The approaches tried range from restricting public smoking for fear of passive smoke, penal taxation of tobacco

products and restrictions on glamorizing smoking in movies. Rational (economic) arguments about the utility of each of these measures are endless. Some social scientists claim that the transition from a casual smoker with no serious health consequences to a serious smoker with attendant health risks is a tipping point. This is a nonlinear procedure not easily influenced by the measures cited above. As usual one cannot integrate all the different advices.

Let us consider another example. Interpretation of dreams continues since Freud initiated the study. Most individuals are at least curious about the significance of dreams. Scientific investigation of dreams as a means of understanding consciousness throws up a completely new picture. This research claims that the human ability to remember dreams is very weak. The answer to a simple question, whether we see color in dreams depends on whether the society is exposed to black and white or color television. While the scientific analysis of consciousness is rigorously and scientifically analyzed, this research is never correlated with the problems thrown up by the well established observation of amnesia and multiple personalities. Similarly, economists employ market rationality arguments to analyze everything from the number of sexual partners to performance of real estate agents but evolutionary scientists decide that the basis for economic analysis has to be evolutionary.

Despite these limitations, modern societies continue to advocate values and norms of society drawing support from so called scientific evidence. Even a cursory look at some issues reveals the limitation of the science as distinct from an integrated feeling of desirability of many of these demands. We think it is easy and desirable to alter human tendencies in some directions but not others. Thus homosexuality is claimed to be inherent in the human psyche and suppression through legal mechanism means suffering. But it is assumed that sexual excitement due to nudity can be easily suppressed and hence demands for public nudity deserve sympathy. Kleptomania or compulsive

tendency to steal is expected to be a justification to be recognized by courts at least for reduced punishment. It is also claimed that adult aggression can be reduced by limiting violence in the toys and games with which children play. But everyone of these deals with human psyche! The scientific support for each of these claims suffers from the limitations outlined above.

This is emphatically not a justification for imposing standards imposed by religion, whether it be laws against sodomy or amputation of hands for theft. The norms of a society are best decided by a democratic decision making. It is unfortunately true that any scientific data establishing the utility of religiously sanctioned behavior is seen through suspicious eyes. Every piece of evidence supporting the so called secular humanistic values is immediately treated as gospel truth. The strength of the science in either case is really not sufficient for accepting this as a guide to action. There are however, justifications for the secular humanistic position that will emerge in a later chapter.

Here we have to understand the distinction between the intellectual satisfaction provided by some rational scientific study and its utility. In many situations objective exploration reduces the dilemmas to a triviality. Even in other situations, unlike the Budian's ass mentioned earlier and in the spirit of Alexander cutting the Gordian knot, humans take both personal and societal decisions. Somehow we do integrate all this cacophony of mutually antagonistic scientific advice without becoming totally anti-scientific and confining our anti-science stand to small aspects of our life.

The usual complaint of scientists and in particular atheists and science communicators is that despite gigantic progress of science, we live in a non-scientific age. Once the fundamental problem with an all science guidance of human life is properly realized one has to be thankful for the human ability to at least accept science in some domains. In so doing one has to recognize a simple truism. The risk to

an eighteenth century anti-vaccination protestor is far higher than the risk to a modern anti-blood transfusion proponent. A person using homeopathy for colds or even arthritis is probably “rational”. He may have at least the benefit of a placebo. Of course someone following that advice for a heart problem is foolish. In practice just as most religious people do not try to light a candle in a gale, most practitioners of alternate medicine advise traditional surgery to a heart patient. Just as one has to evaluate the strength of any scientific advice one has also to quantify the possible penalty and individual has to pay for disregarding the advice.

As this short description shows, scientific knowledge itself is an intimate mixture of exactly known and totally unknown. Scientific endeavor becomes useful when ignorance dominates. Scientific progress results in the dominance of uncertainty. At that stage, scientific investigation will retain the personal intellectual satisfaction but the utility of the knowledge as a guide for human action becomes quite limited. Thus the fractal description of the science, displayed on the cover and described in the previous chapter is a reasonable choice. The description provided here is a distillation of an elaborate analysis of nearly three hundred pages provided in my earlier book “How Well Do We Know it?” For an increased confidence in the conclusions drawn here about the limited scope of objective exploration, that book has to be carefully read and understood.

Now that the strength and weakness of scientific information as a guide to human action has been described, it is at once obvious that to understand the second feature, namely religion, a scientific investigation is rather superfluous. Religion has been scientifically investigated from different directions. Henry James tried to focus on the psychology of the extremely religious in his seminal work “Varieties of religious experience”. Anthropologists and sociologists study the similarities and differences of religion as practiced by various societies. Such studies focus on the religious literature, the rituals, the myths

and the permitted and prohibited behaviors. More recently religion is examined either as an inherited genetically ordained instinct or as a behavior that has emerged as a consequence of Darwinian adaptation, sometimes as an example of group adaptation.

All the scientific investigations mentioned above are based on statistical analysis and the conclusions, while offering some intellectual satisfaction are more or less irrelevant in understanding religion as a guide for personal human action. Trying to know which aspects of religion are superior and useful as an adaptation is quite useless. One may draw a similarity to the endless varieties of advice offered on appropriate diet. An individual cannot try all of them and decide in the available lifespan. While each diet professes a logic, comparing the various logics is useless. One perforce has to accept an approximate advice of “balanced diet” and agree that small variations over short durations will not have grave repercussions..

Henry Poincare, in his great little book, “The Foundations Of Science” pointed this problem of limits on human enquiry in an imaginative way. He pointed out that while ancient Greek scholars would be completely at sea in a seminar on modern physics, they would not be handicapped if they were to participate in a discussion on aesthetics. This reflects a progression in the growth of a hard science like physics. Despite recent efforts at an evolutionary perspective on aesthetics, there is no similar progress in the discussions on aesthetics.

Will Durant in his “Story Of Philosophy”, describes hard sciences as areas where philosophical discussions have progressed into quantitative science. This view is quite popular. It is reflected in the award of a degree of “Doctor of Philosophy” to research in physics. However, this is an expression of a progressive sentiment. It offers a hope that eventually something similar will be possible in other areas of human knowledge. This reaches a zenith in the atheistic hope for a scientific description of values.

However, variable confidence levels in hardcore science point out a flaw in this hope for progress. In many areas of human endeavor, the human mind comes pretty close to the limits of the knowable in a short while. After that, there can be intellectual satisfaction not practical utility. This is reflected most beautifully in the words Irvine Stone pens for Michelangelo in the biographical novel, “Agony and the Ecstasy”. Michelangelo says in effect, “I do not have to be to be better than the pagan Greeks. different yes”. This is easily accepted in art. Perhaps it is sensible to accept that in many other areas of human endeavor, there is intellectual challenge and happiness with success in being different but no meaning to a claim of being better.

The best possibility for a balance between stoic fatalistic acceptance and exuberant demand for perfection and precautionary principle is exemplified by the serenity prayer of the theologian Reinhold Niebuhr. “God, grant me the serenity to accept the things I cannot change, Courage to change the things I can, And wisdom to know the difference”. The spirit of this prayer is ancient. The 8th-century Indian Buddhist scholar Shantideva says, “If there’s a remedy when trouble strikes, What reason is there for dejection? And if there is no help for it, What use is there in being glum?”

The difference between the two is the appeal to God. Thus the second may appear more palatable to the atheist. Similarly, the glory of the golden mean has been much expounded in non-religious philosophy. However this presentation claims that this balance is not possible with only science or rationality, necessitating a role for religion, distinct from the integrating capabilities attributed to areas such as philosophy and literature. Religion as a guide to human action cannot offer quantification or objective rational links anymore than philosophy. In the language used earlier, they all influence integration of multiple choices and guide human action. Influencing the integration is inherently non-rational. Despite this similarity there are fundamental differences between the two. Poincare’s comments about aesthetics

indicate that religion need not be investigated at great depth to understand its utility. There is no point in getting lost in intricate and intellectually challenging details. Most of what is needed can be acquired with little effort as the discussion on religion in the next two chapters shows.



The Red Herrings: Mythology and Theology

Before we discuss how religion can compliment science in guiding human action, we should discuss what religion means. The study of how well we know science, summarized in the last chapter suggests that over precise definitions are not productive. In science we encounter again and again overuse of mathematical quantification leading to what is categorized as GIGO (Garbage In Garbage Out). Feynman makes the same comment in his popular book “The Meaning Of It All”; “I think that extreme precision of definition is often not worthwhile, —in fact mostly it is not possible”. It is always necessary to match the precision of the definitions to the usefulness of the analysis.

So what is religion? Does the word refer to merely the great established religions such as Christianity, Islam and Hinduism with large following? Do we consider various tribal societies as having a religion? Native Indians in the United States certainly claim so. In such societies, the distinction between religious and other cultural practices is vague. But then it may surprise many to know that even courts in India have accepted the definition of Hinduism as “a way of

life” and not a religion like Christianity or Islam. We need a definition that would enable us to understand the three strong views (atheistic, dualistic and devout) outlined in the first chapter.

For the present discussion, the most important part of any religion (and this includes any tribal faith what-so-ever) is the existence of a belief in a non-physical consequence of human action. Physical for the present discussion includes emotional and mental (psychological) consequences. Christian societies in particular have a tradition of separating the mental from the physical and so this inclusion has to be emphasized. Similarly, the atheist examination of religion attributes the mysterious non-physical cause of the devout to their ignorance of science. Thus God is sometimes loosely described in atheist discussions as “God of the Gaps”. The claim in the present discussion is that the belief in non-physical is primary. This belief in non-physical is not the consequence of gaps in current knowledge.

As discussed in the previous chapter, science will always be an admixture of the known and the unknown at every point. It is not a vast uniform field of perfect knowledge surrounded by a simple frontier to ignorance. Certainly, the gaps in current knowledge are immediately associated by the devout with the primary “non-physical consequence” and claimed to be not merely unknown but also unknowable.

This did not matter much in the earlier era when growth in science from one generation to the next was very modest. Once modern science began to close the gaps of ignorance, the contradictions become severe. Some of the problems with the devout attempts to mix science and religion, outlined in the first chapter emerge from this rapid growth of science. In the present discussion we seek to understand the role of religion as a guide for human action. In this quest, for the moment let us accept the primacy of the non-physical consequence provisionally. We will presently justify this and also show that it is the most important part of all religious thought and practice.

In addition to the belief in non-physical consequences, all religions contain mythology as a component. The term mythology implies that these stories are a “myth” a story without a determinable fact or natural explanation. In other words, these stories are not considered scientifically reliable. For our present purpose we will distinguish this from the non-physical cause. Mythology is a descriptive (fictionalized?) account of the non-physical cause in action. The atheist would categorize the primary non-physical cause as a myth. The mythologies of the major religions are extremely elaborate including accounts of creation, glorification of the past and description of the non-physical worlds. The mythologies of the smaller tribal societies may be rudimentary or fragmented. They may or may not include all the above components.

A further component of religion is theology or the logical examination of the tenets of religion. To think is a natural instinct of man. Hence it is only natural that every one would spend some time thinking about their own religious beliefs (or lack thereof). Once again, this examination may not be rigorous in many of the tribal religions. However, theology as it has developed in the context of Christianity has a similarity to Greek geometry. Probably this is true of the other two sister religions, namely Judaism and Islam. As with geometry, there are certain axioms or core statements which are defined based on the religious texts and the observations of respected individuals (saints and prophets). Then these are interrelated and examined using language and logic. In geometry, all theorems are proved logically, starting with five very simple axioms.

It is interesting to look at the experience in the other major group of religions, those that emerged in the Indian sub-continent, Hinduism, Buddhism and Jainism. Here once again there is a lot of logical analysis and discussion. However, unlike the theology of Christianity, there is no internal coherence. There are mutually contradictory statements. These are reconciled with a lot of effort at

logic. The empiricism of the theology is extreme in the case of the Hindu religion where it is often called *Vedanta* and refers to the philosophical discussions which are located at the end (*anta*) of the *Vedas*. Frankly, it requires a lot of conditioning even for a devout Hindu to accept that all the statements therein are consistent. It is amusing to point out the similarity to Hindu mathematics which is once again lot more empirical. There is no emphasis on logically proved theorems which is the feature of Greek mathematics.

The final part of any religion is a set of guidelines for personal action. There are both positive and negative restrictions. Some actions are obligatory or mandatory and some others are prohibited. There is interesting variety in these. In some cases it is possible to decipher an ethical or an evolutionary basis for these rules. Rules against lying or incest are relevant examples. An ethical basis would reflect a conscious decision taken by the practitioners in the past while an evolutionary explanation implies an unconscious implementation. Unfortunately, it is not clear if such explanations really reflect a true description of how these guidelines emerged. With ingenuity both ethical and evolutionary explanations can be imagined for the same rule so probably these are merely *post facto* justifications.

There are other rules which appear abhorrent. The treatment of women in most ancient societies comes to mind. One is left wondering how a religion advocating the highest “ethically justified” rule also advocates such behavior. One is reminded of a modern historian who wondered how Thomas Jefferson, a slave owner could write “... all men are created equal...”. One can make the same comment of Christian saints who tolerated slavery or Hindu saints who tolerated untouchability. Further, there are some rules which appear to be made with a hope that not all individuals will follow them. Rules pertaining to the renunciation of social life are an example. Christianity, Buddhism and Hinduism all rate renunciation of the “normal life in a family” as most praise worthy. There is nothing funnier than a society consisting

entirely of monks. Obviously there is a hope that not everyone will become a monk. The rules and prohibitions of different religions are certainly mutually antagonistic. We will discuss later how these conflicting and diverse commandments, mythologies and theologies still contribute to guiding human action.

The above simple sketch already creates one major objection to advocating a role for religion in guiding human action. The sketch views religion as a combination of some loosely defined components, belief in non physical consequences, some mythology, some elaborate verbose discussion labeled theology and a series of do's and don'ts. Most religions are, despite efforts at the so called interfaith dialogue, not only mutually contradictory, most religious people deprecate religions other than their own. Even in the contemporary world, this does lead to violence. So what sense is there in looking for guidance from religion?

Criticism of religion by the atheist is more relevant for the present discussion than the scientific examination of religion mentioned briefly earlier. The emphasis shifts away from the spirit of objective detachment required for knowledge generation by scientific research. The atheist seeks to divert the devout away from accepting religion as a guide to their actions. He demands reducing the influence of religion on the laws and norms of the society. So in some sense it is antagonistic to the present approach. So let us consider the atheistic criticism briefly.

The atheist, being as mentioned earlier a scientist, sees no merit in the claims by the religious about the non-physical. Mythology is dismissed by the atheist by simply pointing out the multiplicity of myths and challenging a devout person as to why his own mythology has to be preferred and accepted. Many mythological descriptions run directly contrary to science. The claims of many Christians for an earth which is only a few thousand years old is quite famous. Some mythological statements are literally tortured to fit with modern observations. The

comparison of the long duration of the four “*yugas*” of Hindu mythology with cosmological age of the universe is quite popular in some circles. But what about other statements in the same mythology. What about the description of gods and demons churning the ocean of milk? If this is allegorical as the more “clever” Hindus claim, an atheist rightly wonders why the earlier one is not. How can one be selective? Why should one permit an *ad hoc* selection for praise as scientific truth? How to justify this selective allegory escape route?

Similarly the atheist criticism of theology is quite strong. However complicated and intricate the arguments of the theologian, he is logically linking concepts that are intrinsically much weaker than even statistical scientific conclusions. The problem is two fold. As described earlier, all descriptions using words are circular. The meaning of one word is given in terms of other words which are in turn defined by words sometimes including the original one. In scientific disciplines, the words are related to objective operational steps. The concept is linked to a measurement. The definitions of terms quantified using statistical methods are weak. But operational objectivity still exists. This is absent in the case of theological concepts.

Secondly, the concepts of theology are subjective, making the task of an atheist that much easier. As long as strict adherence to logic is the basis of analysis and when subjective experiences are not accepted, theology looses much strength. Ancient Hindu stories admitted that there was no way a committed atheist could be convinced. Thus the ancient Hindu theological discussions were usually limited to those who profess a commitment to a common set of beliefs such as the truth of the *Vedas*.

Strong as such atheist arguments in this attack on mythology or theology are, it is perhaps better to look at the beautiful pen of Mark Twain rather than go through such boring and dry as dust arguments. If exposing the lack of coherence and continuity in religious mythology

and theology is the goal, Twain's short story, "Captain Stromberg's Visit To Heaven" beats all other criticism hollow. It shows how even using its own religious yardsticks, mythological descriptions fail to be coherent.

In the story, he hilariously describes a poor unlettered mother who lost her young child. She spent her entire life on earth pining for the lost child. She consoled herself by remembering that they would be reunited in heaven. In Twain's story she enters heaven but the heaven becomes a continuation of unhappiness for the mother. The child refuses to remain a child for all these years. She is not interested in suffering in heaven and enjoys the powers available to her to change. It makes sense to think of a person in heaven having such powers.

Another description is of a poor poet who was the object of jest of his unlettered audience on earth. But, in reality he has written poetry better than Shakespeare. Heaven has to reward us based on true worth and not merely fame on earth. So this unknown poet gets greater recognition much to the consternation of other residents. Using such cases Twain pokes fun at the unreasonableness of our concept of a heaven.

Admittedly, Mark Twain is not an authority on Christianity. Christian theologians and even ordinary practitioners may find glaring mistakes in this description. But even with these limitations it serves a very useful purpose. It describes in easily understandable way why I claimed that theological definitions are weak. When an effort is made to create an objective operational description, the weakness is exposed. Twain is trying to do this for theological concepts of reward, eternal life and so on. The lesson is clear. Theological scholarship and rigor is not to be compared to rational knowledge. When one has a sympathetic view of the axioms or basis of religion including the belief in non-physical aspects, the theologian manages to work out an intricate argument to project a coherence. This will be acceptable to the devout,

because of the pre-existing favorable view of religion which he shares with the theologian. Naturally an impartial examination by an atheist finds the argument weak or confusing.

Finally the atheist has in the historical record an enormous list of the crimes of the devout. Untouchability, the prescribed doctrine of Hinduism treating some sections of the society as not worthy of even being touched is one such crime. Slavery is of course much more well known. Medieval Christians openly called for severe ill-treatment of Jews. They were to be made to feel that even hell would be better. These are rarely admitted openly but they were precursors to modern anti-Semitism. The list goes on.

The devout can hit back with the records of Hitler and his murder of six million Jews, of the millions who died in the hands of Stalin's police state or perhaps "Pol Pot" the revolutionary leader who exterminated a fifth of the Cambodian (Kampuchean) population. However, this is fundamentally not satisfying. At the end of the day one has to admit that some defenders of extremely inhuman actions, be it apartheid, untouchability or slavery have been the devout. While an atheist would claim the superiority of the modern humanistic practices, a religious individual counters, with some justification that many of those who actively worked for the acceptance of the humanistic values were devout individuals.

At best, atheists recognize some positive aspect of religion only with respect to art and charity. Even here, the approval is qualified. They see secular art and government sponsored charity as substitutes. Once again the criticism is valid. Charity or service is approved by all religions today (and humanists). However, its necessity and utility depends on level of technology and support available from regular government in the country. In a country with government sponsored cradle to grave social support like Sweden, the role for individual or religious charity and service will be naturally limited. People with

conservative economic agenda get the support of the religious groups in the United States and Europe. Perhaps the religious support limits on government spending advocated by the market economists because they do not want religion to loose the halo acquired by charity.

Finally, the atheist highlights a psychological problem in the supporters of the two magisteria. Atheists typically find it perplexing that some scientists claim to be devout. They wonder how this dichotomy is managed. They suspect that in most cases it is public posturing. They object that it is condescending to claim that religion is needed by some people. This is treating people as infants who require “play acting” and “mentoring” by superiors and is obnoxious.

If the atheist criticism is admittedly so strong, how can any role for religion in guiding human action be justified? For the present effort, the key question is not the validity of atheist criticism of religion but its utility. Has atheism anything beyond the fundamental negative stance to offer? Is atheism simply an extrapolation to boring repetition from simple scientific truths. Is it just another intemperate extrapolation of the scientific argument like in any ideology? After all we have encountered similar unjustified extrapolation in other science areas as well. Was Winston Churchill being sensible when he said in “My Early Life”; “I went through a violent and aggressive anti-religious phase, which, had it lasted, might easily have made me a nuisance”.

The first requirement for identifying the true role of religion is not to ignore factual criticisms of the atheist. Validity of atheist criticism need not mean an unqualified support of the atheist position of rejecting any role for religion. When we are humble we recognize not only the validity of some of the atheist criticism but also that unbridled extrapolation is as much a part of religion as of science, both in practice and in theory. As we shall see, the religious outlook brings one to the very same problem of cutting the Gordian Knot that we encountered with using science as a guide to human action.

The importance of the non-physical or non-material component of religion needs to be stressed before we return to the problem of how religion retains, despite the atheist criticism a source for guiding human action. Above all else it shows why the atheist arguments do not seem to have worked. There are self-congratulatory comments of the atheists regarding the declining number of the population who admit to religious observance.

Despite claims, religion has not disappeared due to the onslaught of scientific and rational thinking as was envisaged a hundred years ago. There also lamentations that the future belongs to the religious due to demography. Statistics show that atheists are breeding themselves out of the population. Religion is not some fixed absolute not withstanding the claims of the atheists, the laity and the theologians.

To bring out the importance of the non-physical, we consider one religious injunction and then show that this is universally true of all religions and all injunctions. “Thou shall not covet thy neighbor’s wife”. This is a religious injunction that can come from any Christian pulpit. It is not a commandment but is so completely in consonance with the Christian ethos that there is no problem in associating this with Christianity. This is not to say that other religions encourage coveting the neighbor’s wife. The Christian view point is selected since it makes the argument presented here simpler.

This injunction can be “explained” in terms of desirable societal and personal values. It is apparent that violating this injunction leads to social unrest. The coveting of the neighbor’s wife, if exposed will lead to clashes and violence. This is an undesirable social consequence. It could also lead to psychological problems. Suppression of the coveting can lead to neurosis. This could potentially effect interpersonal relations. This is a psychological justification. There is no physical dimension since only coveting is involved not “physical violation of the woman”.

I propose to create a thought experiment. Imagine an individual who violates this injunction but he lives in solitude. He is confined to his house and perhaps even to his bed, a paralytic for example. Further, there are no visitors. He has a robot which takes care of his needs. Now there is no social or psychological dimension to consider. He cannot hurt the society and his psychological problems will not trouble others. Is the injunction relevant to him? An atheist will have to say NO. The Christian answer would universally be an emphatic “YES”. Coveting the neighbor’s wife is a “SIN” and has to be avoided. So here we have a fundamental and universal difference of opinion. What is the reason for the universal religious response to the example? A Christian, in labeling it as a sin is invoking “a non-physical consequence to the action”. The act in question endangers his “salvation”. Merely trying to describe religion in terms of “values” as opposed to the “facts” of science is not correct.

A fundamental belief in all religions is that “there are non-physical consequences to human action”. It is also true of all animistic faiths which are rarely called religions. When a tribal labels an act as “taboo” it is because there are non-physical consequences. It is not merely the physical, psychological or social consequence of the act that is implied in the taboo. The non-physical consequences may be well categorized in an established religion such as Christianity. They may be “*ad hoc*” in most animistic faiths. It can be claimed that physical consequences were recognized consciously or unconsciously and then the non-physical justifications have been ascribed to the actions. But not all religious ideas make obvious social or psychological sense. In any case, there is no religion or faith which does not propose such a linkage. Thus one has an irrefutable definition of religion: “A belief in the non-physical consequences of human action”.

There are two systems of organized religion which differ in the definition of this non-physical consequence. The cyclic system in the Hindu group of religions (Hinduism, Buddhism and Jainism are

the more prominent) and the non cyclic description of the Abrahamic religions (Christianity, Judaism and Islam). These are the only possible alternative non-physical mechanisms. You enjoy the fruits of your action in the hereafter or you are simultaneously enjoying the fruits of past action. Some religions may invoke non-physical consequences for non human action. The Hindu group permit this for all living beings and in some cases to inanimate objects. However, for the present, these details, including the differences between the Christian and Hindu/Buddhist concept of salvation are irrelevant.

Once the basic definition “Religion is the belief in a nonphysical consequence of human action” is accepted we can define God more accurately. God is the agency that can alter the non-physical consequences. This is beyond human capability. Thus, when a Christian commits a sin, he can ask God for forgiveness.

Asking God for forgiveness is not a means of psychological relief. Such relief may be a consequence but ask a Christian if it is enough and the answer once again universally will be “no”. In Catholic faith, one can confess and the priest will absolve you often with some religious observance as a penance or punishment. The confession is not equivalent to unburdening on a psychiatrist’s couch. It is based on the belief that sincere repentance will result in the sins being forgiven and the non-physical consequences in hell avoided.

The most important point, accepted once again by most faiths is that one cannot demand forgiveness. One can only pray for it. However, there have been instances, when automatic forgiveness following certain religious observances has been assured. For Hindus this was the assured consequence of a dip in the holy Ganges. But even here the issue is not the physical consequences of the action. The financial cost of travel, the enormous difficulties of travel in ancient times, the physical consequences if the water is ice cold and the psychological feeling of achievement are all irrelevant.

In the ability to alter the non-physical consequences, all “Gods” in all religions are equal. They are not “merely” all knowing and all powerful. These are attributes used by the devout to describe God because they recognize this wonderful capability of being able to intervene not merely in the physical consequences of action but in the non-physical consequences. Now the “godless” nature of Buddhism becomes clear. There is no God in Buddhism. There is no possibility of anyone helping one to avoid *Karma*, the non-physical consequences of ones own actions. *Karma* in Buddhism as with Hinduism leads to birth following a death. According Buddhism, while the non-physical consequence cannot be altered arbitrarily by a personal God, “right actions” help one to break this cycle and attain *Nirvana* or *Moksha*. Perhaps some animistic faiths also ascribe gods to various natural objects but do not envisage their role in altering the non-physical consequences. But they all invoke non physical consequences of human action in the first place.

The first lesson from our discussion about the importance the devout ascribe to the non-physical consequence is for atheists who concentrate on “proving” the illogical nature of belief. It is no use trying to point out violations of science or logic. At heart, every believer accepts that there is a non-physical consequence to his action which is not logically defined. For believers, who accept the existence of the non-physical consequences at every instance of their lives, arguments about how unscientific beliefs are obviously makes no impact.

Atheist philosophers also express dismay about the compartmentalization of the mind. They wonder how a believer can use logic only for some aspects of his life. However, for any religious person this is a daily problem of existence. The fictional Pope Kiril in Morris West’s great novel “In The Shoes Of The Fisherman” expresses it most beautifully. “I can pray for divine guidance but will have to act with human reason”. Most religious persons do not expect explicit instructions about every action in life. Even those who are most

committed to their religions end up asking advice from the priests or scholars. In so doing they are confessing their confusion. Actually, when one seeks inspiration from his holy book he is invoking a non-physical mechanism. He hopes that God will inspire a correct response to his problem not that there is a logical inference to be logically analyzed by atheists.

The atheist often taunt the devout by asking how God could permit this or the other human tragedy. Some devout individuals help the atheists by intemperate and ridiculous statements linking human disasters like a tsunami or earthquake to sins of humans. But most devout persons would accept the humility of the fictional pope Kiril when he says "If I could tell you that I would be God myself. An act of faith is an act of acceptance not an explanation." Similarly, no religious person will ever contest that he cannot demand miracles. He may pray for them since ultimately he believes in the non-physical causes and consequences.

The devout accept a non-physical mechanism but do not reject all logic in their life. At the simplest, when the devout refuses to light a candle in a gale as a test of his faith he is exhibiting an aspect of himself when he is valuing science and not religion. The atheist routinely points out that it is condescending to say that religion is needed by some. It is equally condescending to think that a devout person cannot be logical. It is quite easy to be logical and even work as a scientist simply because the day to day work does not get effected by the his being devout. As was pointed out in the earlier chapter, even advanced scientific research is only loosely connected to fundamental theories. So an absolute belief science as demanded by applying the atheistic yardstick is not required.

Neither is being devout a bar to humanistic values in day to day life. It is obvious to most devout individuals that modification of the religion has been going on over the ages. Even the most orthodox

and conservative of religious faiths have had reformations and revolutionary changes initiated and carried thorough by saints and prophets. For the same reason, religious people credit devout individuals for the positive changes in the norms of modern societies. Mahatma Gandhi and Swami Vivekananda, both religious persons have made more lasting changes to the Hindu society than any atheist. Ultimately their ability to transform the society from within is linked to the true role of religion as a guide to human action as developed in the next chapter.

One of the most wonderful descriptions of this ability of the devout to value both science and religion is provided by Winston Churchill. “Indeed, it seemed good to let the mind explore as far as it could the paths of thought and logic and also good to pray for help and succour and be thankful when they come”. “The supreme creator who gave us our minds as well as our souls would not be offended if they did not always run smoothly together in double harness”.

To be honest, the most cursory examination of the acts of the prophets or saints proves that rational and logical examination is quite silly. It is quite possible to pick and choose some acts or preaching of a prophet and hold it up as a great example of religious ethical behavior that can be compared with the best secular humanistic values championed by the atheists. The Sermon On The Mount is perhaps the most famous example.

But consider on the other hand that the same Jesus Christ who preached “whoever slaps you on your right cheek, turn the other to him” drove the money lenders from the temple. Consider the statement of Jesus “Let he who is without sin, cast the first stone”. If this be the rule of law then why have courts and policing? The wonder is how the words transformed the actions of a wild crowd of humans. The key issue of these stories is not such arguments based on logic. Actions of saints and prophets are not to be logically examined.

And for those who question the authenticity of these Biblical stories, the relative calm that Mahatma Gandhi, a religious leader and a saint, generated during the partition riots in Bengal would be an eye opener. But then see his advice to a self confessed murderer of Muslims. “Go find an orphaned Muslim and bring him up as a Muslim”. Surely against the law but can one ignore the resonance in the human heart? Then consider another of his dictums. “Recall the face of the poorest and weakest man you have seen, and ask yourself if this step you contemplate is going to be any use to him.” Now is this rational? Is it practical? How long do I do this introspection? What if I cannot honestly decide? What if like most actions, it helps one and harms another?

Consider one of the most beautiful consolations offered by the Buddha to a woman who lost her child. He told her to get a handful of mustard seeds from a family whom death has not visited so that the child can be brought back to life. In sharing the grief of others says the story, the woman got peace and returned the Buddha. But now let us be idiotic and logically analyze this. Would it work if the old woman has already heard the story? Would she go around asking? How useful is it today? Intellectually the idea is still used but would anyone go round the village? These few anecdotes are my personal favorites. There are millions of such stories and anecdotes to choose from. The conclusion is inescapable. In dealing with religion, saints and prophets logical examination is nearly useless. Paraphrasing a famous saying, “It is seldom of much efficacy except when it is superfluous”.

It was mentioned earlier that one of the strands of the scientific investigation of religion was the effort to understand the psychology of the saints as exemplified by the varieties of religious experience. The key question is why the knowledge of saints is relevant to the ordinary individual. When I cannot be a saint is it only hypnosis that I follow them? As pointed out above while there is something in the saints and prophets intrinsically attractive to some humans, this cannot be rationally investigated. At the very least such investigation is futile.

To be honest there are the hardwired among the devout who refuse to even consider a change and yearn for a return to the uncontaminated past. But most are not that pigheaded. Similarly some devout persons insist on the absolute validity of theology and mythology. These rigid positions are far from merely claiming the validity of religion in the abstract. Most devout individuals, even while claiming to be convinced of the truth of their religion admit the conflict and challenge in resolution of specific dilemmas. For this reason, devout literature and discussion grappled with such problems for ages.

A good example to appreciate the issues would be a short story “Was it heaven or hell” once again by Mark Twain. In this story a pair of devout old Christian ladies tell lies to a mother and child who are both sick. They hide the ill health of one from the other. The mother and child eventually die. Later an archangel visits the old ladies and asks them if they repent their sin. The pair concede that they cannot truly repent. They are not certain that if faced with the same circumstance once again, they would not commit the sin again.

The question Mark Twain leaves at the end for the reader to think about is whether God would understand the human emotional issues and send them to heaven or stick to the rule of the law “Thou shall not lie” and send them to hell. The spirit of the devout who, as pointed out earlier, turn to the priests and scholars for guidance is to get a subjectively satisfying answer to the such queries. They neither expect nor want logical answers.

Actually parables and stories are extensively used to investigate the complex interrelationship between religion and the individual in most religions. Balancing personal salvation with being your brothers keeper is a common issue for discussion. This reached the ultimate in Buddhism. In one sect of Buddhism, it was ordained that even personal salvation should not be desired till every other human gets salvation. This to avoid the selfishness of seeking one’s own salvation.

However, while outlining the importance of the non-physical core of religion one cannot overlook some extremely negative consequences. As an example from literature that sheds some light consider George Bernard Shaw's play "Saint Joan". Here a priest says "I am not thinking of this girl's body, which will suffer for a few moments only, and which must in any event die in some more or less painful manner, but of her soul, which may suffer to all eternity". To save the soul the woman is to be burned on the stake! Well this is fiction. But consider the inhuman treatment meted out by the traditional Hindu males to widows for centuries. One has to remember that the women being most ill treated were the mothers, sisters and daughters of the very men. Unless one assumes that these men were not humans, one has to understand the "fear of the non-physical" that acted as the driving force for such behavior. So unchallenged belief in the non-physical could be dangerous. But humans are very complex. Even fear of the unknown non-physical consequences is not needed for trapping humans into patently nauseating behavior. That is the conclusion one can draw from the banality of evil in the third Reich. Ordinary humans were so indifferent to the inhumanity of their own actions. Even habit may be sufficient to turn a man into a monster.

I tried to show why the validity of atheist criticism of religion is in essence beside the point. For this reason the present chapter has been called, "The Red Herrings: Mythology and Theology". Atheist criticism of these attributes is really a red herring, something which intentionally or unintentionally misleads or distracts from the actual issue. While the discussion so far does not clarify as to how religion can be a guide to human action, clearly the atheist criticism is not productive. However, historically religion has undergone reformation or revolution. The accepted practice of Hindus of today is not the practice a hundred years ago. However, the horror stories in the newspaper show how bad some of us still are. Practice has admittedly changed and at least partly due to devout individuals themselves. When we admit the atheist criticism of some of the historical crimes attributed

to the devout we admit that there are situations when religion has misguided in the past.

So a key question remains. When does practice of religion become dangerous? Does religion continue to be a possible source for guidance despite these? What roles do mythology and theology play in guiding human action? What is the morality of the guidelines of religions? The devout certainly consider the conduct sanctioned by the religion as universally desirable ethical behavior. This in view of the above acceptance is simplistic. But then what is the possible role of religion as guide to human action?

In the present discussion, I adopt a different approach, one that certainly formed one strand in the amorphous religious doctrine of Hinduism. I use three words, *neeti*, *nyaya* and *dharma*. The thought process in the present discussion is inspired by these terms in the course of my personal experience as a Hindu and my perusal of the Hindu religious texts. In particular the distinction between *nyaya* and *dharma* that I outline follows Rallapalli Anatha Krishna Sharma's Telugu lecture series about the poet Vemana. But I am neither citing any texts nor claiming any originality. I suggest their provisional acceptance to understand the logic of the analysis in subsequent chapters.

In my scheme, *neeti* is practical advice based on logic, observation and analysis. Arthur Ryder in his introduction to "*Panchatantra* (the five scriptures)", the famous *neeti shastra* (treatise on *neeti*) says *neeti* is "...practiced only by a social being and represents an admirable attempt to answer the insistent question, how to win the utmost possible joy from life in the world of men". *Neeti* is the harmonious development of the powers of man, a life in which security, prosperity, resolute action, friendship and good learning are so combined as to produce joy. The goal is to perform the task on hand optimally. Thus "*Panchatantra*" talks about the ways to make friends, and break friendships. There is no value judgment on the two. One is

expected to be able to do both as required for successful living. Victorian Christians were properly aghast that the Hindu religious texts advocated or condoned telling lies in some situations. These were not morals or ethics being preached. These are advice on the best course of action in that situation and is always labeled “*neeti*”. Confusing *neeti* with morals is something that is quite common in contemporary Hindus too. Possibly this is the indirect influence of Islam and Christianity. For my present purpose I use this word *neeti* to designate finding an optimum way of resolving human problems. Thus for me scientific advice is equivalent to this *neeti*. It has no ethical connotation. But it involves assessing the strength of science.

The second concept I want is *nyaya*. This is the ideal conduct that that instinctively appeals to one and all. In the ancient Sanskrit *subhashitam* or wise saying this distinction between *neeti* and *nyaya* is clear. “Whether those versed in *neeti* praise or condemn, a great man will follow the path of *nyaya*”. In modern Indian languages, *nyaya* is equated with justice. To get feel for the distinction I am after, consider the famous saying from Judge Oliver Wendell Holmes, Jr. “This is a court of law, young man, not a court of justice”. Law is based on the constitution or precedent in the country and may not be universally appealing to all humans. Justice appeals to all humans as it “encompasses ethical or humanistic practice”. An atheist thinks that the idea of what is just would emerge from science and rational thinking. He also hopes that the distinction between laws and justice implied in the above quotation would disappear with rational thinking. The limitations of these hopes has already been discussed. However, we for the present will provisionally consider *nyaya* to be the “best possible ethics or justice”. We admit provisionally that we humans can only aspire for this abstract idea but not really rationally know it. As we said of the concepts of theology earlier, we cannot operationally define justice. In science, we can have a approximate theory without any idea of what the perfect scientific theory is. So we can have approximate universal ethical behavior that may be admired without being sure of

what the perfect ethical behavior is nor justify logically why we accept some specific concept as universally ethical. The key distinction I wish to draw here is that this is not conduct encouraged or prescribed by religion.

The third word I choose is *dharma*. While *dharma* is often describes as righteous conduct, the key idea for the present discussion is that it is the conduct specified and suggested by religion. This is what in religious circles would be called divine law. Every religion would agree that compliance with this code of conduct will lead to personal salvation. As we admitted earlier each religion means different things when they speak of the divine law. In any case, religions normally do not distinguish between *dharma* and *nyaya*. Most devout persons would claim that they are identical. In the Hindu context there is some distinction that is referred to here and there. No claim is being made that this distinction is universal to Hinduism or that it is exclusive to Hinduism. As far as my experience goes and that is certainly limited, there is more scope for mutually antagonistic and even contradicting statements in Hinduism than anywhere else.

The key point of the present discussion is that hopefully (and that is the correct word for it) a nuanced appreciation of the code of conduct, theology and mythology of any religion would ensure that ones own personal conduct is an expression of *nyaya*. This is a subjective integration of the three aspects of religion that contributes to a personality. This cannot be unambiguously subdivided into individual steps nor justified logically and scientifically. When the role of science as a guide to human action was discussed, one came to a dilemma. An integration of different mutually antagonistic scientific “truths” was found necessary. The present discussion is an expression of hope that *neeti* can be a tool of human action leading to *nyaya* if one chooses *dharma* carefully. Please note the difference with conventional religion which usually demands obedience and conformity with the divine law. I have conceded that this has not delivered *nyaya* universally.

I view the transformation of religious practice that has been encouraged and implemented by individuals, saints and laymen included as a slow movement towards *nyaya*.

Thus in assigning a role to religion in guiding human action I am not employing extremely torturous and arcane logic to justify theology and mythology. Nor is there any attempt to question the validity of the atheistic criticism of the undesirable and often extremely obnoxious actions of the devout, least of all by degenerating into questioning the equally repugnant actions of some atheists. Unfortunately there are problems for the devout in accepting the atheist criticism. It is necessary but difficult for the faithful to recognize that the age in which you live defines the religion you need and use and that this does not automatically mean becoming an atheist. We will return to these problems later.

In the course of the next chapter we develop a reasonable assessment of why religion rather than pure atheism can be expected to deliver on the promise of leading one on path of true righteous conduct or *nyaya*. A really great character in the Hindu epic, *Mahabharata*, *Yudhisthira* is asked to define *dharma*. He says “*Mahajanah ena gatah sa pantha*”, the path followed by great people. But then, one has to be certain that one is following a great man. How does one identify the great man whose guidance or example can be followed? In a certain sense, it is to ask how one may know that the devil is not quoting scripture. The key to this will be explored in the next chapter.

IV

TO Know Thyself

So, what is my basis for advocating a role for religion in resolving the inevitable dilemmas of human existence? The existence of innumerable dilemmas is universal human subjective experience. While Budian's ass is a intriguing paradox, humans in general do not suffer from inaction. "Hamlet, the prince of Denmark", is a wonderful fictional character created by the genius of William Shakespeare, who is stunned into inaction by a dilemma of "to be or not to be". But it is rare to find real individuals who resemble Hamlet. It is more common to accuse an individual of being extremely committed or mulishly obstinate in doing the same thing.

Is the difference between being committed and obstinate merely the difference between being a success and a failure? We will also find individuals willing to take spontaneous decisions. What is the difference between a lucky chance and uncommon perceptivity? However, we take decisions. Why is it common to have doubts after the fact? Alexander provided a symbolic story for decisive action when he cut the Gordian Knot. It is not recorded if he expressed any regrets.

As noted earlier, scientific examination of the processes of decision making merely provides quantified uncertainty. It is more meaningful to think of the aspects of our life which are obviously influencing the subjective decision making process. Once again we will consider only the simplest and most common experiences secure in our confidence that detail will only serve intellectual curiosity and be useless in practice. This is part of the universal perception mentioned at the start. To be sure no experience is absolutely universal just as no fact can be universally accepted. But unlike the scientific study of religious experience of saints or special individuals we look at subjective experiences of reasonable common people.

One thing is certain. We can provide justifications for our choices and we often justify every one of our actions. But we do not consider the justifications to be absolutely rational like conclusions of a theorem of geometry. Most absolutely rational decisions are so trivial that these are not even worthy of being called a decision. We do not think of avoiding a potentially fatal jump into an abyss as a decision. It is rational but also trivial. When an individual commits suicide by taking that fatal jump we wonder why this decision was taken. This may be labeled a non-rational decision but we do recognize this as a complex subjective decision that needs effort to understand. Having thus confined our discussion to those subjective decisions which by a reasonable consensus can be considered non-trivial, we should look at our subjective experience and ask a question “what factors influence our decision”. However, we looking at subjective experience not objective scientific evaluation.

It is obvious that the food we consume has some influence. Most people who have experience of drinking alcohol confess that this leads to lessening of inhibitions. So, a small amount of alcohol in the blood stream does change the decision making process. Whether this change is desirable or not is beside the point. When it reduces the shyness of an individual in a social occasion it may be termed desirable.

When it leads to more risky driving after the social occasion it is undesirable. Over-eating resulting in dyspepsia also influences our decisions. Many other experiences can also be considered.

We can expand the definition of food here. Many other chemicals that enters our body influence decisions as does food. Most smokers claim that smoking “calms the nerves”. Thus it would influence their decisions. The experience is similar to alcohol. The role of stimulants ranging from opium to cannabis has been recognized since ancient times. More serious and more bizarre manifestations of the influence of chemical molecules on the human body can be culled from scientific literature but we will not follow that path.

Our decisions are also obviously influenced by our mental state. Thus the student jokes that the teacher was more strict in evaluating his answer paper since the teacher had a bad time with his wife. We admit that when one is happy one is also more liberal and relaxed in our decisions and vice versa. Thus emotions play a role in influencing the decisions. Hence the folk wisdom that a decision be better taken with a cool mind and not when extremely agitated.

Even without citing modern scientific analysis it appears reasonable to accept that the human body produces a range of chemicals that influence the human emotional states just like the stimulants described above. It is also reasonable to accept that physical activity not merely physical fatigue can influence the human emotions through a similar process. Mild exercise has a similar effect of calming your nerves and providing a calm mind for decisions.

Then one has the intellectual capability to analyze and appreciate. Science and search for rational solutions is only one part of this human capability. Literature influences the human emotions. One feels various emotions for the characters in fiction even while one intellectually knows that the characters are imaginary. Many a

person can be found sobbing as a tragedy is enacted on the stage or even in a movie theatre. The philosophical analyses one reads also influence our perceptions and actions. Similarly, poetry has an immense impact on the human psyche; as has music and various other art forms. This indirect relation between literature, philosophy, visual and performing arts is almost universally accepted. This recognition accounts for both our desire to propagate our views and the various demands to ban or limit the availability of material that is not to our taste.

As usual, a scientific endeavor to try and separate the roles of these various factors will provide more information but will not resolve our core dilemma. The intellectual stimulation, the sensory inputs of seeing and hearing, the influence of inter human interactions, the physical activity we undertake and the very food we consume influence the human decision making in complex and ill defined ways. The physical body, the chemical internal system, the neural networks of the brain that stores information and emotions are all interlinked. We will now see how religion is useful as an addition to science as a guide to this subjective entity, called the individual.

As mentioned in the earlier chapter, all religions have a belief in non-physical consequences of human action and include a mythology, theology and code of conduct. The complex subjective complex entity, formed by the inter linking of experience, emotions and the physical body appreciates these three aspects of religion at many levels.

The belief in the non-physical along with theology that articulates this belief interacts with the individual at two different levels. Firstly it provides some “intellectual satisfaction”. Every human being has a intellectual curiosity and a tendency to argue abstract issues. Most also have a tendency to be oblivious of inconsistencies and fallacies that are obvious to a logician or a philosopher. The atheist would strenuously argue that what has been labeled “intellectual

satisfaction” here is mere speculation and imagination and not “intellectual”. As with my response to most atheist arguments, I concede the point.

But even a wrong explanation provides one with a certainty and closure. This is particularly true of complex problems where prospects of solution are remote. It is not necessarily and universally true that one prefers being perpetually on the limbo, on the horns of a dilemma waiting for rationally satisfying solutions to emerge. An honest examination of our subjective experiences will reveal many instances, when solutions that one realizes subsequently were wrong or even absurd provided satisfaction earlier. In any case, in most complex issues, the scientific conclusions are quite weak and reveal only dilemmas. There is thus no necessity to look down on the claim that the belief in non physical and the intellectual arguments of theology serve as a satisfying catch all substitute for non-existent scientific truth. Prudence is certainly required. It is foolish to simply reject science. In the course of my presentation I have always deferred to science. Prudence is equally required before accepting everything that is claimed to be backed by science.

A second contribution from these logically or rationally infirm speculative ideas of theology is their contribution to expression of emotions. This is particularly true when theology with its halo of scholastic expression turns its attention to the attributes of God. The atheist may point out logical inconsistencies of the vision of a personal God who is simultaneously all powerful, all knowing and all loving. For the average devout individual these limitations are irrelevant. Such attributes and adjectives enable formation of emotional bonds with the God. To the devout, the these attributes are required for the limited mind to help in appreciating what he conceives as divinity. The articulation of the greatness of the personal God as developed by theology helps the devout person’s sense of awe to be closely correlated with human emotions.

Mythology is important for the devout without having to be a verifiable historical record. Mythology is useful in itself as a contributor to the emotional linkages that are so important. Just like the logical inconsistency of theological arguments, the truth value of mythology is not relevant for the average devout individual. Critical sociological examination of the religious texts is not very fruitful in convincing the devout. It is not that the devout are not aware of the inappropriateness of the behavior of some of the figures in the mythology. Pointing out the attitudes of mythological figures towards slavery or their rejection of feminist equality is often highlighted by the atheists. They are properly perturbed at the indifference of the devout. For the Hindus, *Ramayana* and the central character Lord *Rama* are figures of adoration. An Indian author, Muppala Ranganayakkama wrote a huge volume in Telugu comparing the *Ramayana* with a poisonous tree. It received nothing more than applause from the committed atheists.

The reason why such criticism plays only to the galleries is not far to seek. The respect of the devout to a mythological figure is not born out of an intellectual appreciation of the claims of divine action. The respect to divinity comes along with the faith in the non-physical. This respect is then fleshed out with descriptive accounts justifications and responses to the criticism. The primary faith would be more influenced by the emotional bonds one has. Thus, people whom one respects and adores, (saints or preachers) influence the devout with their own attitudes. So one may be respectful of Jesus since a father figure in ones own life has respect for him. It is not based only on a personal assessment of the Bible. This is a form of acceptance by authority but one based on emotional links between individuals.

The diversity of mythological narratives offers a wide scope for the formation of the emotional linkages with the objects of veneration. This is most easily noticed in the multiplicity of Hindu gods. One can have a choice based on the beauty, awe, fear or respect that one feels. The devotee can consider the God to be a baby and let

forth his own *vatsalya* (affection to all children not merely ones own). He can consider God to be a just master and offer his willing servitude. He can consider God as a mother and offer his filial devotion. Or the devotee can even consider the God to be his lord and master and model his own relationship to that between a wife and husband. This relationship with the associated sexual perceptions has shocked Western Christian scholars on initial exposure. The Christian mythology has only permitted God to be viewed as a master or a father with baby Jesus in his manger as an exception. But the Hindus held that every relationship and every emotion is divine when the object of such emotions is divine.

This leaves the essential code of conduct imposed by religions. This may be a very strict and elaborate code as in the Jews. It may be a small list of prohibitions or voodoo in tribal faiths. All ritualistic observations serve two purposes. One is to establish a group larger than the immediate family with whom emotional links can form. More importantly, it gives stability to the human conduct. Despite great men like Rabindra Nath Tagore disparagingly calling it “dreary desert sand of dead habit”, there is something to be said for forming and following a set of habits.

Universally, in every aspect of our lives, the food we eat, the colors we prefer for our dress, the music we enjoy and so on, man would like to experiment but also forms strong likes and dislikes. These likes and dislikes are not easily changed and often cause discomfort and unease when changed. Following a ritual is the religious way that contributes to the balance required for the holistic decision making. Shared rituals and behavior contributes to bonding. One would expect rigidity and orthodoxy to be the only consequence. But, the reverse is also true. Just as one respects *Rama* because Gandhi prayed to him, one tends to act on Gandhi’s criticism of behavior even when it contradicts ones own understanding of the scriptures. Once again, the emotional bond with Gandhi helps. Thus religion is primarily subjective

and emotional. This can and has often in the past led to the undesirable consequences. In the language of last chapter, despite the above hope, religion has often not contributed to an integrated holistic movement towards *nyaya*. We will return to this issue later.

It would be useful to look at the Hindu concept of *yoga* at this juncture to clearly delineate the concepts being discussed. As with the use of the words, *nyaya*, *neeti* and *dharma* in the last chapter, this is a personal exposition. There is no claim that this is the actual intent of the original writers of these matters. Nor is there any claim of originality or first exposition. Simply that a personal reading and thinking of these matters triggered the present idea. The word *yoga* is now-a days most commonly associated with the system of exercises and postures. There is no lack of gurus who make various claims both about the primacy of these exercises or the benefits of their own interpretations and guidance.

But I wish to associate this word as a shorthand for *asthanga yoga* or *yoga* of eight parts. The parts themselves are named *yama*, *niyama*, *asana*, *pranayama*, *pratyahara*, *dhyana*, *dharana* and *samadhi*. I would not discuss *dharana* and *samadhi* in this discussion. These are normally associated with the supernatural claims. To me this is irrelevant just like the truth value of the mythology or the logical consistency of theology. In a general sense, *yama* is restraint while *niyama* is the code of conduct one accepts. *Yama* and *niyama* are thus similar to ritual component of religion. These not only deal with the physical body, they are external to the individual.

Asana and *pranayama*, the next two components are also associated with the physical body. But these are internal to the individual. The postures and exercises that grace the covers of books on *yoga* are *asanas*. *Pranayama* is control of the breath. As I mentioned above these get the maximum exposure in the popular and commercial circles. *Asana* and *pranayama* are efforts to control the internal body

system by conscious action on the physical body. Should one concede anything to these beyond a universal adage to take a deep breath before doing something important? Such a question belongs properly to the domain of science. *Pratyahara* is literally the proper selection of food but more correctly the choice of proper sensory inputs. *Dhyana* is contemplation and often associated closely with *japa* or repetition of the sacred words. Here it is the mind that is sought to be controlled by conscious action. With contemplation of the divinity in all its various manifestations, the emotional and intellectual connect that was stressed in earlier paragraphs comes in.

One has in the Indian philosophical traditions, emphasis on action (*Karma Yoga*), contemplation of reality (*Jnana Yoga*), devotion to the divine (*Bhakti Yoga*) or concentration on the asana and pranayama (*Raja Yoga*). Efforts at integrating them are common as are endless debates about the superiority of one over the other. These have occupied Indians for millennia. As usual we will not get into these scholastic details or arguments.

The analogy that I am making with this ancient Indian religious idea is simple. For religion to subjectively help integrate the complex mutually contradictory scientific or rational advice, it has to help discipline the body, the mind and the intellect. This is the personal hope that living could become a subjective expression of *nyaya*. Justification other than the appeal of the idea to my own intellect is tenuous. One can only claim that this is a historically known path of religion. Some examples of saints who have had some salutary influence on the societies of their times can be cited. In view of the analogy one can make broad or liberal interpretation of what constitutes the various components of *yoga* as described here. Thus one is not limited by specifics of the religion. What I have done is to dissociate the integration from the claims of both salvation and the supernatural. As with any aspect of religion and religious people the negatives not only exist, they overwhelm. We will return to discuss such concerns .

A natural question to ask is whether religion is necessary for this three fold disciplining of the body mind and intellect. Before we discuss this a small detour to certain aspects of religion will be useful. Even among devout individuals, modernity has led to dismissal of both ritual and sometimes idolatry. The ancient arguments and sometimes violence against idolatry were due to the usual conflict between different rituals. That is the conflict that Jonathan Swift so humorously depicts in “Gulliver’s Travels” as the fight between the big-endians and little-endians in the imaginary land of Lilliput where individuals are six inches tall. The modern reason for disdaining ritual and praising intellect is snobbery.

Perhaps because of the sheer variety of religious streams in India it is possible to identify several occasions when a loosely similar intellectual traditions against ritual, personalized gods and idolatry were attempted. Interestingly one of such traditions was called the *sankhya* and may have been the originator of the whole yoga concept. *Sankhya*, emphasizes the *asana* and *pranyama*. The image or entity which is the object of *dhyana*, contemplation can even be a dream. Obviously there is no “God” and it has close similarities to Buddhism. The tradition of “*advaita*” or “monism” as it is often translated expects everyone to “realize” that the perception of an individual self is an illusion and it is possible to realize this ultimate reality of the unity of all existence. Sikhism is another strand that explicitly prohibited idolatry. Similar is more modern “*Brahmo Samaj*”. We will not discuss the philosophy of any of these traditions nor the influence of the mainstream monotheistic religions, Islam and Christianity on these traditions.

The prosaic fact remains that every one of these sects have with time become indistinguishable in practice from the rest of the Hindus with their personal gods, temples of worship and other customs. The oldest of these Buddhism, deviated far from the original injunctions of Buddha against ritual, created the persona of *Bodhisatva* in the *Jataka* tales and has elaborate rituals in the surviving sects. *Sankhya*

degenerated into many microscopic groups, each emphasizing specific rituals which include stimulating drugs like hashish and utterly disgusting sexual acts. While Guru Nanak, right at the start of the “*Guru Granth Sahib*”, railed against pilgrimages to various rivers, modern Sikhs take pride in their pilgrimages to number of “*Gurudwaras*” (Sikh Temples).

It is not that there is a degeneration in the lofty intellectual heights, the necessity for emotional linkages is the driving force for these transformations. Similarly, it not religion that inspires art. Artistic expression becomes an integral part of religion to encourage the emotional links. The descriptions of Irving Stone in his masterly biography of renaissance artist Michelangelo, “The Agony And The Ecstasy” are no doubt fictional. But they tell the essential truth. The “pieta” that Michelangelo carved is not merely a great piece of art. It is an expression of the emotional link between Michelangelo as the creator and his religious nature. It is the truth of that link which makes the reader feel the descriptions are so appropriate. Theology, mythology and ritual all contribute to that nature. They are not primary nor are their rational limitations really relevant.

There are often calls in the scientific-atheistic and humanistic circles to develop a parallel to all aspects of religion. One can easily visualize the awe that every scientist experiences replacing conventional theology and mythology. Could a combination of secular art, literature and philosophy unified through this appreciation of the real beauty of unweaving the rainbow serve as a true and complete “atheistic alternative to religion”? Would we have then found the “religion” in Einstein’s famous comment, “Science without religion is blind”?

Actually, as a guide to human action, literature, philosophy or art lead one to the same dilemmas one encountered with science. Consider, the contrast between Newton with his objective rational analysis and Rousseau with his emphasis on spontaneity, subjectivity

and introspection as the two ends of a spectrum of philosophical analysis. While the superiority of one over the other is endlessly debated, scientific investigation shows how the spontaneous innate, subconscious response is influenced by habits, norms and the external world. As usual one gets intellectual satisfaction not advice that can be easily implemented.

Similarly, philosophy can only illuminate not solve the most fundamental of the human dilemmas, between the excitement of novelty and comfort of habit, which effects the just born baby as much as the greatest philosopher. Poet Rabindranath Tagore in his “Gitanjali” says “Where the mind is without fear and the head is held high..... Where the clear stream of reason has not lost its way, Into the dreary desert sand of dead habit.....Into that heaven of freedom, my Father, let my country awake”. Condescending attitude towards acting by habit, learning by rote etc. is a common refrain of most intellectuals. These are things to be despised or at best merely tolerated. The great Indian poet Kalidasa converted this into a positive claim about the aesthetic value of novelty. He said “Beauty is that which takes on a new form every instant” Anything changing constantly, dazzling in novel ways is certainly attractive. But then, constant seeking of novelty can itself become a habit. Running behind the new, however desirable does not in the end satisfy. This is a universal subjective experience not merely a religious injunction.

There is a dilemma of whether to be lenient or strict with ones own children. There is no dearth of “good advice” not only from scientific investigation but also from philosophers, but we all know that following these automatically is a recipe for disaster. There is a dilemma of freedom and responsibility in interacting with other members of the society. Should one support a social norm or law because it advocates “freedom of the individual” assuming that most people would be responsible or opt for some restrictions on such freedoms since some people will not be? Philosophy is as helpless in

resolving this as “scientific” conclusions based on statistical information.

It does not require much experience of the world to call for moderation. Thus one enjoys humorous sayings such as “Everything in moderation including moderation” or “Every rule has an exception including this one”. The Greek philosophers came up with the idea of a golden mean, or a golden rule and other ancient societies had their own versions of such advice. While attractive in the abstract, the advice does not help in deciding what the golden mean is in a given situation. Identifying the golden mean is not a problem to be solved by simple rational thinking. It cannot be outsourced to the computer.

Once this essential limitation of not merely rational knowledge but even other intellectual effort in resolving human issues is realized the utility of religion as outlined above may appear a bit more subjectively reasonable. Perhaps one can take a lesson from the attitude of the devout towards theology. For all the respect outwardly professed to it, one also hears a kind of mockery of the theologians. The devout claim that nobody cares for theology except the theologians. It is not any great contribution to one's own salvation.

The major limitation with an aspiration of a secular atheistic alternate to religion however is not this limitation. Firstly the intellectual awe of unweaving a rainbow is not quite universal. Only the great scientific minds could appreciate the general theory of relativity as a truly awe inspiring creation of Einstein. But most others would only be able to appreciate a small part of the greatness of the theory. In most other scientific endeavors, as was discussed earlier, the link to the awe inspiring fundamental theory is quite tenuous. Most science is observing statistical correlations. While it will surprise and excite the practitioner, it does not really contribute a sense of awe. For most, even in science, the subjective sense of humility in the presence of something great has to be acquired by respect to authority. This is also the limitation of

secular art. There is no perception of something larger than oneself. As one puts in an effort to understand the science, there can even be an arrogance having understood. As we shall see, humility is the most important aspect. Neglecting humility has been the major reason for the failure of religion too.

The second and major limitation is the lack of a link to the emotions and this is very fundamental. It is certainly possible to become emotionally attached to secular service. While I did tend to sympathize with the devout claims of internal reformation as contributing to the humanizing traditional moral codes, one cannot be blind to the contribution of the atheists either. Most of the present proponents of ethical treatment of animals are certainly not devout in the traditional sense. However, stronger these emotional bonds with an idea and the desire to contribute to the effort, weaker the bonds with atheism. Consider an atheist running a charitable orphanage. The stronger the emotional bonds he develops, the better he will be at the job. But then he will have more sympathy with the devout who are in similar activities and makes common cause with them for most of his efforts. This reduces his sympathy to atheist claims which he would see as largely beside the point. If one restricts to the large government impersonal offer of services, not only is one saddled with the bureaucracy and inefficiency, one loses the essential link to one's own emotions.

My personal choice for a definition of *nyaya* is “*vasudhaiva kutumbakam*”, treating the whole world as a family. There is no family without emotions. Despite the criticism of the atheist which I largely endorse, I see no hope for subjectively progressing on the quest for this purely with logic and intellect. I will address the concerns of the atheist with my program as well as the unease of the devout in the final chapter.

V

Return To The Walk

To summarize, the walk on a the knife edge between science and religion becomes inevitable because of the fractal nature of scientific and rational knowledge. The tendency of uncertainty to replace ignorance makes sole reliance on science as guide to human action impossible. The need is for a subjective integration of mutually contradictory or incoherent information. For such a generation of wisdom from knowledge, religion with a reliance on intellect, emotions and ritual works better as a guide in human action. The limitations of religion as highlighted by the atheist, scientific critical examination are beside the point.

This is my subjective assessment of religion as the second of the “magisteria”, not the conventional idea that religion provides values and science the facts. I propose that religion provide a path for subjective integration of knowledge and aspirations, converts information to wisdom and hopefully leads to improved behavior aspired by the secular humanists. In this view, religion is completely unrelated to objective and consensually accepted realm of science. Including religion as a

guide to human action is thus a hope for some kind of a subjective effort to integrate the physical, emotional, and intellectual approaches to resolve the dilemmas of science. And thus the best human effort is a walk on the fractal boundary between science and religion. The emphasis is on hope. This is not a guarantee. I hope for a subjective acceptance of the entire argument not a rational justification that impresses the logician.

This hope is probably not realistic. The above may not be acceptable to either the atheists or the devout. The atheist would question my conclusion that the progress of science and towards secular humanism is self limiting. More emphatically he would question my claim that the truth value of the mythology and logical consistency of theology are irrelevant. These are responsible for the religious practices that are bad with reference to secular humanism. He would also claim sole credit for the partial progress towards the current secular humanistic values and see religion as a hindrance to these values.

It is a problem for the atheist to concede that that secular humanist values are themselves some kind of common law choices. Any concession to religious practices will form a barrier to his cherished goal of leading the society towards some kind of a humanistic heaven. The intellectual is rarely happy to extend the principle of equality of all individuals to letting them decide. This applies as much to the economic ideologies as to the secular and religious. There is a joke that those who shout “power for the people” actually mean that power should be given to those who do the shouting.

The atheist position has a lot of commonality with the approach of modern society. Modern society encourages and approves extreme positions. It provides huge financial rewards to the winners. It respects and applauds the winner. Those who fail are ignored if not rejected. This hero worship cynically ignores the large number of failures. After all, success can come into focus only in contrast to the failures.

Societal norms of modern society also emphasizes minimizing restrictions and enhancing the freedom of the individual. Any societal norm constraining individual freedom is challenged by emphasizing the negative consequences. At the same time, some modifications of the human behavior are claimed to be extremely sensitive to external influences, while others are rigid and questioning these leads to misery and psychosis. The science backing all these is very weak but this is conveniently ignored.

Away from this encouragement to the individual for intemperate effort, and perhaps taking perverse sadistic pleasure from the failures, the society tries to be perfectly safe. The practical limitations in implementing such a strong precautionary principle, are once again ignored. While happiness or pursuit of happiness is claimed as the reason for all this, that these new norms have indeed resulted in a happier society is not proved. All this ignores that ultimately a human being is simply not an inmate of a prison ruled by the jail manual. He partly enjoys the restrictions on his freedom imposed by the society.

In my earlier monograph, “How Well Do We Know It?”, discussing the limits of science as a guide to human action, I explicitly identified democratic decision making as the only justifiable process for societal decision making. The core requirement for an operational democracy are merely the freedom to advocate change and a honest mechanism for implementing changes desired by the majority. I considered “fundamental rights” and other features of the modern advanced societies as not essential. I countered the worries of free market economists with some rational arguments showing that a country will not economically slip down on the road to serfdom. The same is the answer for the atheist fear that respect to religion will result in the loss of current humanistic values and the return to medieval practices.

Whatever the atheist claims, the self limiting capability of humane laws in contributing to human happiness is too obvious to

me. The atheist takes pride in the accomplishments of science in improving life of a vast majority of the human society and imagines no imitations in tackling smaller and smaller issues. In this effort to bring heaven on earth he overlooks the limitations of the very concept of perfect existence. In practice, freedom for the pursuit of happiness and the ability to take pleasure in novel accomplishments are severely limited by the reality of human existence. The accomplishment of a balance between the opposites has to be undertaken with an understanding of this reality.

The extrapolation that with effort, the entire population could become committed to rationality, acquire a “scientific temper” and become committed to the atheist cause is doubtful. While the modern atheist may take pride in the number of people who are not committed to the Christian norms in the modern society, he will have to be appalled by the popularity of the non-mainstream nonsense, some of which is worse than the religion he despises.

The present effort to look at the practice and rituals of religion as influencing or catering to the necessities of the physical body, with the mythology contributing to the emotional and theological arguments to the innate rationality of humans will be at first glance be very distasteful to the devout. This may appear to be a repackaging of the current “scientific” or “rational” analysis that seeks to understand religion in the Darwinian paradigm as a “useful adaptation”.

In James Hilton’s novel, “The Lost Horizon”, the Chinese character Chang says “Must we hold that because one religion is true, all others are bound to be false?”. It is perhaps easy for me to agree intellectually that it is not necessary. However even the most cosmopolitan and liberal Christians and Muslims may be unwilling to agree. After all the first commandment is that “There is but one God”. In practice, the belief in religion translates into several different strands. Many devout individuals in the contemporary world are pragmatic.

They claim to believe in miracles but do not actually expect to see them performed. The key problem for many of them in renouncing the possibility of miracles is not practical. It is the fear that to do so would undermine their own belief and commitment to the religion. The worry of the devout is how to balance toleration with commitment. For similar reasons, they claim efficacy of prayer to expect “miracles” that go contrary to “natural laws of science”. This is distinct from the belief in the truth of mythology. Mythology refers to events that are claimed to have taken place in the past while these miracles are a contemporary manifestation of the divine. However, the pragmatic devout individuals in the modern democratic west, while paying lip sympathy to the validity of the code of conduct of the religion, would be content with freezing the changes that they are seeing around them.

The confusion of a genuinely devout person cannot be brushed aside. If there is no sanctity to my own religion, why follow it? One worry about admitting any doubts regarding the theology and mythology is the requirement of a balance between desire for personal conviction and permitting the next man to have a different opinion. There is a genuine fear of unweaving the rainbow. Just as many a poet thinks that science in unraveling the rainbow has spoiled the appreciation of its beauty, a devout individual fears that his faith is compromised by accepting any criticism of the religious truth. Further, the ego of the devout may cause them to emphatically proclaim in public their commitment to the truth value of both theology, mythology and sometimes even practices.

In addition to these, one sees, particularly among the Hindu groups, a belief in the “ancient science” resulting in the acquisition of various miraculous powers and an adamant belief that the ancient texts of wisdom show indications of the current science being known in that era. There are devout persons who emphatically refuse to consider the smallest challenge to their mythology and are willing to renounce science if so required. Then there are the devout who wish to return to

the ancient rules of conduct and even willing to implement their desire forcefully. Obviously and even emphatically my discussion does not offer any sympathy to these views.

I have response for the concerns of the mainstream devout individuals though. If religion is subjective then trying to evaluate a religious event objectively is counter productive irrespective of the result of the investigation. The story of Apostle Thomas not being sure about resurrection of Jesus till he felt the wounds himself is famous as “Doubting Thomas” and considered an example of skepticism. I suggest that the story is unrealistic. Skepticism is an attitude. If one were a skeptic one would not be convinced by testing either. The exercise is of no use. After all the problem with any scientific analysis is uncertainty. Thus one is never going to be satisfied by either a positive or negative result.

A few years ago there was a lot of public outcry in India about idols of the Hindu God with an elephant head, Ganesha drinking milk. This lasted about half a day. A colleague asked me if I was interested in checking. I refused. My point was that if as a scientist I actually observe the disappearing milk I will try to find a physical cause, surface tension, porosity etc. On the other hand if I were a true believer I would not be converted by a negative result anyhow. So objective testing is useless.

The atheist gleefully recount failures of scientific investigation of the devout starting with the statistical analysis of death of priests in ship wrecks to the recent failures of a modern guru to deliver the claimed levitation. I would like to draw a different type of conclusion from somewhat different evidence. The Catholic Church appoints a priest called “the devil’s advocate” who investigates all claims on behalf of an individual who is being Canonized, officially recognized by the Church as a saint. This is a priest who questions the evidence presented in support of the miracles attributed to a proposed saint. I compared

the description in Morris West's sixty year old fiction "The Devil's Advocate" with the reports of recent Catholic canonization efforts. West describes in the fiction, efforts to apply the strict rules of science, confident in the existence of the divinity. The rules as applied recently have dilute norms, presumably to ensure that at least some of the saints are canonized.

But for me nothing illustrates the madness of objectively evaluating religion as Gandhi's failure. Here was an individual who believed in religion and actually began to believe that the ritualistic practice would suppress his innate sexual urges. He was shocked by his failure but was honest enough to have himself reported it. That these episodes of his experimentation were not dug out by a detective journalist is the greatest evidence of why Gandhi is really a Mahatma, justifying Einsteins quote in the first chapter. For me, the pity is that he could not reconcile himself to the fact that sexual excitement is just like thirst and hunger. It is as fundamental as the pain he would feel with a pin prick. He could not realize that the mind can control and canalize human behavior but the process has limits even if they vary from one individual to the other. When the greatest of the saints had to breath, not withstanding the stories in the Hindu scriptures, what is the need to look for objective evaluation of subjective religious experience.

Holding your own theology and mythology as "objective" truths like science is neither necessary nor useful. Traditional religion emphasized conformity to the code of conduct too. We will be hard pressed to accept that code of conduct sanctioned by religion has a value irrespective of the effort one makes to perform it. One surely cannot compare the risk of travel in historical times to modern travel even if both have the same goal, to perform a pilgrimage sanctioned and praised by code of religious conduct. Value of theological study without the easy availability of books and the internet should be given more respect. As conceded in the earlier chapter, while discussing

atheist criticism of the religious values of the devout, abject surrender to the norms has been clearly counter productive. Unbridled extrapolation is as much a part of the behavior of the devout as of the secular atheist. This would include unquestioned obedience too.

The attitudes and expectations of the devout doubtless change with time as they should. One needs humility to recognize that practice ordained by one's own religion need to be subjectively assessed. Then one also realizes that differences in theology, mythology or practice do not matter for the subjective use of religion as a guide to human action. The religious practice of today is not the practice of the coreligionist a hundred years ago; much less the practice at the time of the Prophet Mohammad or Jesus Christ. The religion we require for our needs depends on the time we live. Forming our own subjective assessment of mythology and theology is as much a part of this as deciding on our daily actions. It would be best to humbly realize that our assessments of theology and veneration of mythological figures are as much in the neural networks of our brain as the proofs of the Pythagoras theorem and the awe of the Einstein's theory of relativity.

Richard Dawkins, in a beautiful essay "Sadly an honest creationist" cites Kurt Wise who said, "As I shared with my professors years ago, when I was in college, if all the evidence in the universe turns against creationism, I would be the first to admit it, but I would still be a creationist because that is what the Word of God seems to indicate. Here I must stand." Sad, because it is not needed. The word of God can very well be a "subjective experience". Kurt Wise is expressing the standard fear of the slippery slope. But, one does not automatically become an atheist by admitting the objective validity of science nor is your belief in science compromised by admitting subjective religious practices and guidance.

The essential subjective nature of religion is most beautifully expressed by Raymond M. Smullyan in his book, "The Tao Is Silent".

The extract from the imaginary conversation between God and a mortal quoted here is illuminating. “MORTAL: So you won’t tell me whether or not you exist? GOD: I am not being willful! I merely wish to point out that no answer I could give could possibly satisfy you. All right, suppose I said, *No, I don’t exist*. What would that prove? Absolutely nothing! Or if I said, *Yes, I do exist*. Would that convince you? Of course not. MORTAL: Well, if you can’t tell me whether or not you exist, then who possibly can? GOD: That is something which no one can tell you. It is something which only you can find out for yourself. MORTAL: How do I go about finding this out for myself? GOD: That also no one can tell you. This is another thing you will have to find out for yourself.”

As Churchill so aptly described, it is not very difficult to let the human intellect free and at the same time to ask for divine help and express gratitude when one subjectively feels an experience of it. The problems will emerge when one begins a scientific experimentation of this experience. Marx famously said “Religion is the sigh of the oppressed creature, the heart of a heartless world, just as it is the spirit of a spiritless situation. It is the opium of the people. The abolition of religion as the illusory happiness of the people is required for their real happiness.” But opium in small doses is good medicine. Neurochemicals similar to opiates are generated by the human body and contribute to the feeling of happiness. Excessive religion is a germ that causes a major disease, the disease of intolerance but then a small weakened germ may be a vaccine, preventing disease.

The question of when it is too much and when one is becoming harmfully dogmatic is not objectively answerable just as there is no foolproof mechanism to decide when science is degenerating into GIGO. It is for this reason that one has to walk the knife edge in a spirit of humility always aware of the limitations of both the subjective and the objective ways of resolving human dilemmas.

Is rational knowledge sufficient to guide all human actions? Many claim that religion is needed in addition. The strength of scientific, intellectual advice freely offered by experts needs to be assessed. Accepting religion as a guide is problematic. Mythology cannot be objectively verified and there are many of these. Religious practice has resulted in undesirable and in some cases extremely obnoxious acts. Can one justify a role for religion despite this? When does scientific advice become irrelevant? When does religious guidance become dogmatic and dangerous? These issues are analyzed without getting bogged down by confusing details of advanced science or over precise study of religious texts. Then, one can assess the utility of science and religion as a guide of one's own action. The path for human action emerges as a walk along a fractal knife edge with science and religion being objective and subjective guides.

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